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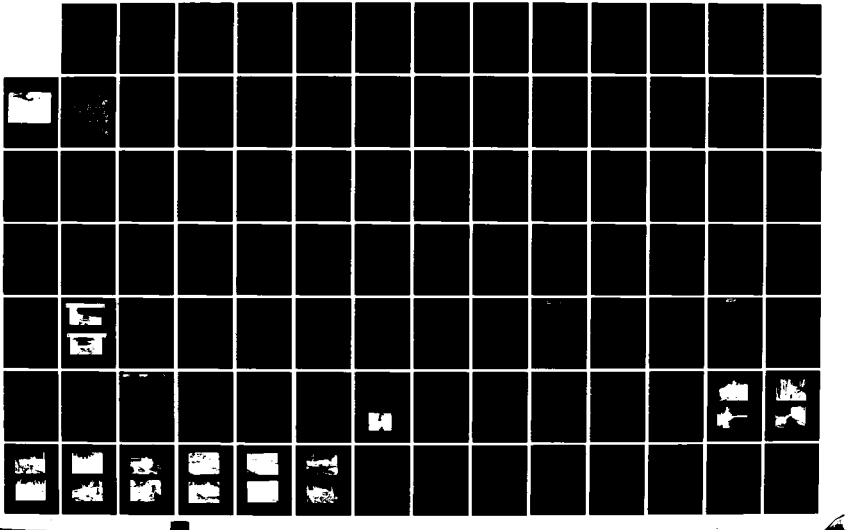

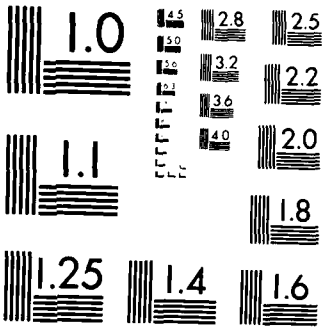

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WOONASQUATUCKET RIVER BASIN

SMITHFIELD, RHODE ISLAND

GEORGIAVILLE POND DAM
RI 03108

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

APRIL 1979

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Woonasquatucket River Basin
Smithfield Rhode Island
Woonasquatucket River

20 ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is an earth dam that is about 2500 ft. long with a maximum height of 27 ft. The dam is considered to be in fair condition. It is intermediate in size with a high hazard potential. The test flood for the dam is the full PMF. The owner should engage the services of an engineer experienced in the design of earth dams to accomplish various items.

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WOONASQUATUCKET RIVER BASIN
SMITHFIELD, RHODE ISLAND

GEORGIAVILLE POND DAM
RI 03108

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

Identification No.:	RI 03108
Name of Dam:	Georgiaville Pond Dam
Town:	Smithfield
County and State:	Providence County, Rhode Island
Stream:	Woonasquatucket River
Date of Inspection:	30 November 1978

BRIEF ASSESSMENT

Georgiaville Pond Dam is an earth dam constructed about 1850. The dam has a maximum height of 27 feet and is approximately 2500 feet in length. The spillway is located at the left abutment of the dam embankment. This stone masonry spillway has a crest length of about 112.5 feet and is divided into two distinct sections by the outlet works. An abandoned penstock to an adjacent mill complex and gate structure is located near the right end of the dam.

Due to its age, Georgiaville Pond Dam was neither designed nor constructed by present state-of-the-art procedures. Based upon the visual inspection at the site and the lack of engineering, operational and maintenance data, there are areas of concern which must be corrected to assure the long-term performance of this dam. The dam is considered to be in FAIR condition. Deficiencies include large trees growing on the dam embankment, variable dam crest elevations, overtopping and inadequate discharge capacity of the spillway and outlet works and potential erosion from alignment of the downstream channel near the toe of the embankment. The storage capacity of the pond is relatively small compared to the drainage area, which results in a high potential for overtopping and flooding of the downstream channel abutters.

This dam is classified as INTERMEDIATE in size and a HIGH hazard structure in accordance with the recommended guidelines established by the Corps of Engineers.

The test flood outflow for this dam equal to the full PMF is 20,073 CFS (598 CSM) and would overtop the dam by about 3.1 feet; there-

fore, the spillway capacity is considered to be inadequate. Testing the dam using one-half the PMF flow also results in overtopping the structure by 1.60 feet. The maximum spillway discharge of 3,773 CFS represents only 19 percent of the test flood outflow. Overtopping could result in the failure of this earth embankment dam.

It is recommended that the Owner engage the services of an engineer experienced in the design of earth dams to accomplish the following: evaluate and design a seepage monitoring system to collect and record the flow; establish a procedure for removal of large trees and roots from the dam embankment; evaluate and develop a plan of restoration and rehabilitation of the downstream channel and spillway, evaluate the impact of the test flood on the existing facilities and upgrade the configuration of these structures to increase the inadequate spillway capacity; repair the masonry walls of the spillway, riprap and erosion areas on the embankment.

A discrepancy between directives in a standing order from the State of Rhode Island and present operational practice, regarding water level in the pond, exists. This discrepancy should be resolved.

Recommendations and remedial measures listed above and detailed in Section 7 should be implemented by the Owner within one year after receipt of this Phase I Inspection Report.

C-E MAGUIRE, INC.

BY: Richard W. Long
Richard W. Long, P.E.
Vice President

RICHARD W. LONG
No. 3529
REGISTERED
PROFESSIONAL ENGINEER

This Phase I Inspection Report on the Georgiaville Pond Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

SAUL C. COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, DC 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or to property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any opportunity to detect unsafe conditions.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonable possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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about station 9+50, the rock toe appears to terminate at natural ground. Several zones of seepage are apparent downstream of the rock toe as illustrated in Photos C-13 and C-14. The water is flowing in some areas, but appears clear with no fines apparent. The ground in the seepage areas is very soft.

Between stations 10+00 and 18+00, the downstream slope is covered with large trees up to about two to three feet in diameter, and little grass. A pool of water was observed at the toe of the slope at about station 14+50 (Photo C-13). Erosion is apparent at many locations on the slope. At station 11+50, there are remnants of a building foundation. A vertical concrete foundation wall for this structure about ten feet high at the upstream edge of the slab is slightly curved outward in the downstream direction.

From station 18+50 to 22+00, the downstream slope is similar to the upstream slope. There is a masonry wall with soil sloping from the base of the wall to an adjacent road. Erosion is evident in some areas.

c. Appurtenant Structures. The appurtenant structures for this dam are the overflow spillway and the control gate outlet works structure, and the abandoned gates on a penstock formerly used for industrial water supply to the mill complex.

1. Spillway and Training Walls. The outlet gate structure divides the spillway into two sections as shown in photographs C-4 and C-9. The general condition of the structure was judged to be fair to good. The right spillway weir is a concrete cap on a cut stone masonry base. The left weir of the spillway is cut stone blocks. The training walls consist of unmortared stone rubble masonry. The right training wall appears to have many dislodged stones, some of which reduce the effective height of the wall. Stone work is missing from the training wall along the line of the spillway crest, reducing the height of the training wall.

2. Outlet Works. The outlet works is located at the spillway, and consists of a mortared cut stone masonry structure which appeared to be in good condition. The layout of the structure is shown on the drawing in Appendix B. The detail shows a section through the structure as well as an elevation of the structure. The vertical lift rack and pinion gate mechanism recently installed (1978) was in

area was apparently excavated to extend a backyard for an abutting home. (See photograph C-16).

2. Upstream Slope. In the section of the dam from station 2+00 to 10+00, there is a five-foot high stone masonry wall on the upstream slope of the dam with a IV:2H earth slope from the base of the wall down to the pond. The soil has eroded up to four feet from in front of the wall in some areas. The wall is discontinuous, has collapsed in several areas, and is covered with brush and small trees. (See photos C-1 and C-2). Riprap is absent in many locations and numerous riprap failures and zones of erosion on the upstream slope are apparent.

   Between stations 10+00 and 13+50, the crest of the dam is reduced in height and the upstream slope forms a sandy beach.

   From station 13+50 to 18+00 the upstream slope of the embankment is soil covered with grass and trees, up to about 12 inches in diameter.

   A stone masonry wall runs from station 18+50 to 22+00 on the upstream slope of the dam with soil sloping from the base of the wall to the pond. In many locations the wall has collapsed, and substantial erosion of the retained soil has occurred. At station 19+00, the wall is exposed for a height of approximately four feet as shown in Photo C-3. Riprap is absent in many locations and at other areas, riprap failures and zones of erosion on the slope are apparent.

   Beyond station 22+00, the dam has been excavated to extend the backyard of an abutting home, as shown in Photo C-16. The upstream slope is covered with trees up to one foot in diameter and riprap in some locations.

3. Downstream Slope. For the cross-section of the embankment from station 2+00 to 10+00, the downstream slope is covered with numerous large trees, up to about two to three feet in diameter (Photos C-4 and C-6). Grass cover is sparse on the slopes and patchy riprap exists in many locations. Erosion is evident at many locations.

   At the downstream toe of the dam there is a rock toe berm constructed in 1969 by the Corps of Engineers (Photos C-6 and C-7 and cross section in Appendix B). The average width of the bench of this rock toe is about 23 feet. At

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General. Based on visual inspection, history and general appearance, the Georgiaville Pond Dam and appurtenances are judged to be in fair condition. The dam embankment is overgrown with many large trees, unchecked erosions areas exist; and the crest is not level, but rather irregular in elevation.

The gate mechanism recently installed, appeared to be in good working order, however the mechanism is exposed and hence subject to vandalism. The service bridge leading to the gate structure was unpainted and in need of maintenance.

Reference stationing is indicated on the photo index sheet in Appendix C.

b. Dam. The dam is an earth embankment. No construction drawings are available, nor are the details of design and subsequent repair known.

Extensive emergency repair work was reportedly performed in 1969 by the U.S. Army Corps of Engineers. Additional work was performed in 1969, which involved placing an impervious blanket of silt on the upstream face of the dam.

1. Crest. The crest of the embankment varies in width and elevation. Between station 2+00 and station 10+00, the width varies from about 14 to 21 feet and is maintained as an unpaved roadway. Some erosion is present and there is slight undulation of the surface where ruts, several inches deep, are present. (See Photo C-4 for a typical view of the crest). From approximately station 10+00 to 18+00, the level of the crest of the dam is low (approximately 7.0 feet below other portions of the dam), and a beach and paved parking lot are located in this reach. The pavement extends from approximately station 13+50 to 18+00. At station 14+50 the crest is approximately 130 feet wide. Construction of the beach was reportedly performed in the 1950's.

From station 18+50 to 22+00 the crest is grassed, and erosion is evident in some areas. A portion of this section of the dam is a former railroad embankment. (See photographs C-3 and C-5). Beyond station 22+00, the crest

SECTION 2

ENGINEERING DATA

2.1 Design. No design data is available for this dam. Several inspection reports have been included in Appendix B.

2.2 Construction. No record of construction is available for this dam. Several inspection reports pertaining to modifications are included in Appendix B.

2.3 Operation. No operation records of this facility are maintained.

2.4 Evaluation

a. Availability. There are no plans, specifications or computations available from the Owner, County, State or Federal Offices regarding the design, construction or subsequent repairs and modifications to this dam.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspections, past performance and sound engineering judgment.

c. Validity. The validity of the limited data must be verified.

6.	D/S Channel	Natural bed in Rock

j. Regulating Outlet

Refer to paragraph 1.2b "Description of Dam and Appurtenances" for description of outlet works.

1.	Downstream invert	134.67
2.	Size	Two-4 ft. wide by 5 ft. high rectangular stone masonry openings.
3.	Control mechanism	Manually operated vertical lift gear mechanism, uncovered, on concrete slab platform.

2.	Test Flood Pool	130
3.	Flood Control Pool	N/A
4.	Recreation Pool	130
5.	Spillway Crest	130

g. Dam

1.	Type	Earth Embankment
2.	Length	2500 feet
3.	Height (main embankment)	33 feet maximum
4.	Top Width (main embankment)	21 feet
5.	Side Slopes	Upstream 2.0H:1.0V Downstream 1.5H:1V
6.	Zoning	Unknown
7.	Impervious Core	Unknown
8.	Cutoff	Unknown
9.	Grout Curtain	Unknown
10.	Other	--

h. Diversion and Regulating Tunnel N/A

i. Spillway

1.	Type	Overflow, broad crest, vertical fall.
2.	Length of Weir	112.5 feet
3.	Crest Elevation	153.0 (from USGS Topographic sheet)
4.	Gates	None
5.	U/S Channel	Natural bed

2.	Maximum Tailwater	145.09 (recorded and marked at site)
3.	Upstream Inlet Invert	134.67
4.	Recreation Pool	153.0
5.	Full Flood Control Pool	N/A
6.	Spillway Crest	153.0
7.	Top of Dam (parking/area crest) (Main Dam Emb. crest)	158.0 164.8
8.	Test Flood	161.09

d. Reservoir (Length in Feet)

1.	Maximum Pool	5,000
2.	Recreation Pool	5,000
3.	Flood Control Pool	N/A

e. Storage (Ac-Ft.)

1.	Recreation Pool	1,300
2.	Flood Control Pool	N/A
3.	Test Flood Pool	2,340
4.	Spillway Crest Pool	1,300
5.	Top of Dam (El. 158.0)	1,950

6. Net storage between top of dam (EL. 158.0) and spillway crest is 650 Ac.-Ft. and represents 0.36 inches of runoff from the drainage area of 33.58 square miles.

7. One foot of surcharge storage equals 0.07 inches of runoff from the drainage area of 33.58 square miles.

f. Reservoir Surface (Acres)

1.	Top of Dam	130

Due to the relatively large size of the watershed and the concentration time, it is improbable that all surface runoff will peak at the reservoir simultaneously during a high intensity rainfall event. In addition, the large upstream storage areas in the watershed tend to dampen and delay the peak of the surface runoff.

b. Discharge at Dam Site. There are no discharge records available for this dam. Listed below are calculated discharge data for the spillway and outlet works:

1. Outlet Works:
   To Woonasquatucket River - Two 4-ft. wide by 5-ft. high rectangular gates.

2. Maximum Known Flood at Dam Site - 1376 cfs (date unknown).

3. Overflow spillway capacity @ top of Dam - 3773 cfs at Elevation 158.0 (beach and parking area).

4. Overflow spillway capacity at "Test Flood Level" - 7766 cfs at Elevation 161.09.

5. Gated outlet capacity at normal pool level - 764 cfs at Elevation 153.0 (spillway crest).

6. Gated outlet capacity at maximum pool level - 878 cfs at Elevation 158.0 (beach/parking area crest).

7. Total project capacity at "Top of Dam" - 4651 cfs @ Elevation 158.0 (beach/parking area crest).

8. Gated outlet capacity at test flood level - 941 cfs at Elevation 161.09.

9. Total project discharge at "Test Flood Level - 8707 cfs @ Elevation 161.09.

c. Elevations (Feet above National Geodetic Vertical Datum, NGVD)

1. Streambed at centerline of dam - Upstream - not observable
   Downstream - 126.3

As a result of these inspections, a gravel berm was placed along the toe of the main dam embankment in March of 1969 under the direction of the Corps of Engineers. This berm is shown on the typical cross-section included in Appendix B. The work was completed under the provisions of PL 99/84 as a temporary emergency measure to increase the stability of the embankment and to provide a controlled means of egress for seepage water.

In May of 1969, the Town of Smithfield purchased the dam .

Further rehabilitative work was accomplished in December, 1969 by the owners, in an attempt to seal the leakage through the embankment by placing a blanket of silt in the pond along the upstream slope of the dam. The silt was placed by depositing the material through the water. No record drawings, design calculations, or specifications are available regarding the placement of the silt blanket.

Records indicate that the last rehabilitative work performed at the dam was the replacement of the outlet works gates in 1978. The old, deteriorated timber gates were replaced with steel gates.

The penstock which leads to the mill complex building was reportedly plugged with concrete in the late 1960's.

i. Normal Operating Procedures. Operation of the spillway gates occurs on an as-needed basis. Usually once or twice a year. Mills below the Georgiaville Pond Dam require water for industrial purposes (approximately 6 MGD or 18.4 Ac.ft/day). The downstream mills notify the Town of Smithfield (Highway Department) when normal flow in the river is insufficient and releases are required. Gage marks painted on the left side of the spillway channel (See Photo C-11) are used by operating personnel to estimate the flow releases.

1.3 Pertinent Data

a. Drainage Area. Georgiaville Pond is located in Providence County in northern Rhode Island. The basin is generally rectangular in shape with a length of approximately 6.5 miles, a width of 5.3 miles, and a total drainage area of 33.58 square miles (See Drainage Basin Map in Appendix D). The topography is generally flat to rolling with elevations ranging from a high of 627 feet to 153 feet at the spillway crest. Basin slopes are flat to moderate having slopes of 0.03 feet/foot to 0.08 feet/foot. The average time of concentration for the entire drainage basin is estimated to be two to three hours.

f. Operator. Operating personnel are under the direction of:

Mr. Alonzo Thurber - Highway Commissioner
Director of Public Works
Town of Smithfield
64 Farnum Pike
Smithfield, Rhode Island 02917
401/231-3400

g. Purpose of Dam. The Georgiaville Pond Dam impounds water from the Woonasquatucket River for recreational use. Water released to the River is utilized downstream and is about 6 MGD (18.4 Acft.)

h. Design and Construction History. The dam was reportedly constructed around 1850; however, its present configuration resulted from additional construction about 1882. No construction records other than limited correspondence are available regarding the history of construction, repair work or maintenance.

Record correspondence indicates that in 1882 there was concern for the safety of the earth embankment, due to extensive seepage through the base of the dam. It is unknown whether corrective action was taken at that time by its owners, the Bernon Manufacturing Company. No further correspondence was available until 1936 when the spillway gates were reconstructed. Records show that the dam was owned by the Semolina Macaroni Company at that time and that it was owned by them, until 1951 when the Industrial Tool Company purchased the property.

In April, 1956, leakage through the embankment was cause for concern and resulted in an inspection of the dam by the Rhode Island Department of Public Works (Division of Harbors and Rivers.) It was the opinion of the Inspector at that time that the leaks were of a minor nature and the overall condition of the dam was good. Another inspection with similar findings was made in December, 1958.

Downstream erosion problems from spillway discharges in the March, 1968, storm resulted in a subsequent inspection of the dam and downstream area by Department of Public Works, Division of Harbors and Rivers. On August 26, 1968, the dam was declared unsafe due to extensive seepage, the size and quantity of trees on the face of the embankment, and the lack of a properly defined downstream discharge channel. A subsequent inspection was made by the Corps of Engineers on September 6, 1968. All of these inspection reports are included in Appendix B of this report.

b. Description of Dam and Appurtenances. The Georgiaville Pond Dam is approximately 2500 feet in length and is an earth embankment that is 33 feet high with a crest width of about 21 feet. The right portion of the dam consists of a railway embankment, now abandoned and a beach area. The main portion of the dam embankment is to the left and has a berm along the downstream toe which was added in 1969 that measures about 23 feet wide, 10 feet high. The typical upstream slope is about 1V on 2H and the typical downstream slope, 1V on 1.5H. An unpaved roadway traverses the crest of the embankment over most of the length of the dam. A stone masonry spillway and outlet control structure are located at the left abutment of the dam. The recently renovated outlet structure is located near the center of the spillway. The structure houses two gates, each 4 feet wide by 5 feet high. The control mechanism for the vertical lift gates are manually operated, geared, rack and pinion lift system.

An abandoned control structure and penstock is located toward the right end of the dam. This penstock is reportedly plugged with concrete and was used to provide process water to an adjacent mill complex.

At the present time, discharges from Georgiaville Pond flow through the outlet control structure gates and/or over the spillway crest to the downstream channel and the Woonasquatucket River.

The dam embankment has two distinct crest elevations, the main portion of the embankment and railroad embankment being about 7 feet higher than that portion of the dam located at the beach and parking lot area.

c. Size Classification. Impoundment capacities calculated for each of the two crest elevations, the main embankment and the beach and parking area, are 2834 and 1950 acre-feet, respectively. These impoundment capacities warrant classification as INTERMEDIATE.

d. Hazard Classification. The dam is classified as a HIGH hazard structure because failure could cause the loss of lives and extreme property damage. Estimated damages include homes (10), commercial properties (5) (Stillwater Road, Whipple Avenue and State Rte. 104, roadways, utilities (telephone and power adjacent to the damaged roads) and wide spread flooding. See Appendix D for calculations.

e. Ownership. The Georgiaville Pond Dam is owned by the Town of Smithfield, Rhode Island.

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

NAME OF DAM: GEORGIAVILLE POND DAM

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army through the Corps of Engineers to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. C-E Maguire, Inc., has been retained by the New England Division to inspect and report on selected dams in the State of Rhode Island. Authorization and notice to proceed was issued to C-E Maguire, Inc., under a letter from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-79-C-0015 has been assigned by the Corps of Engineers for this work.

b. Purpose.

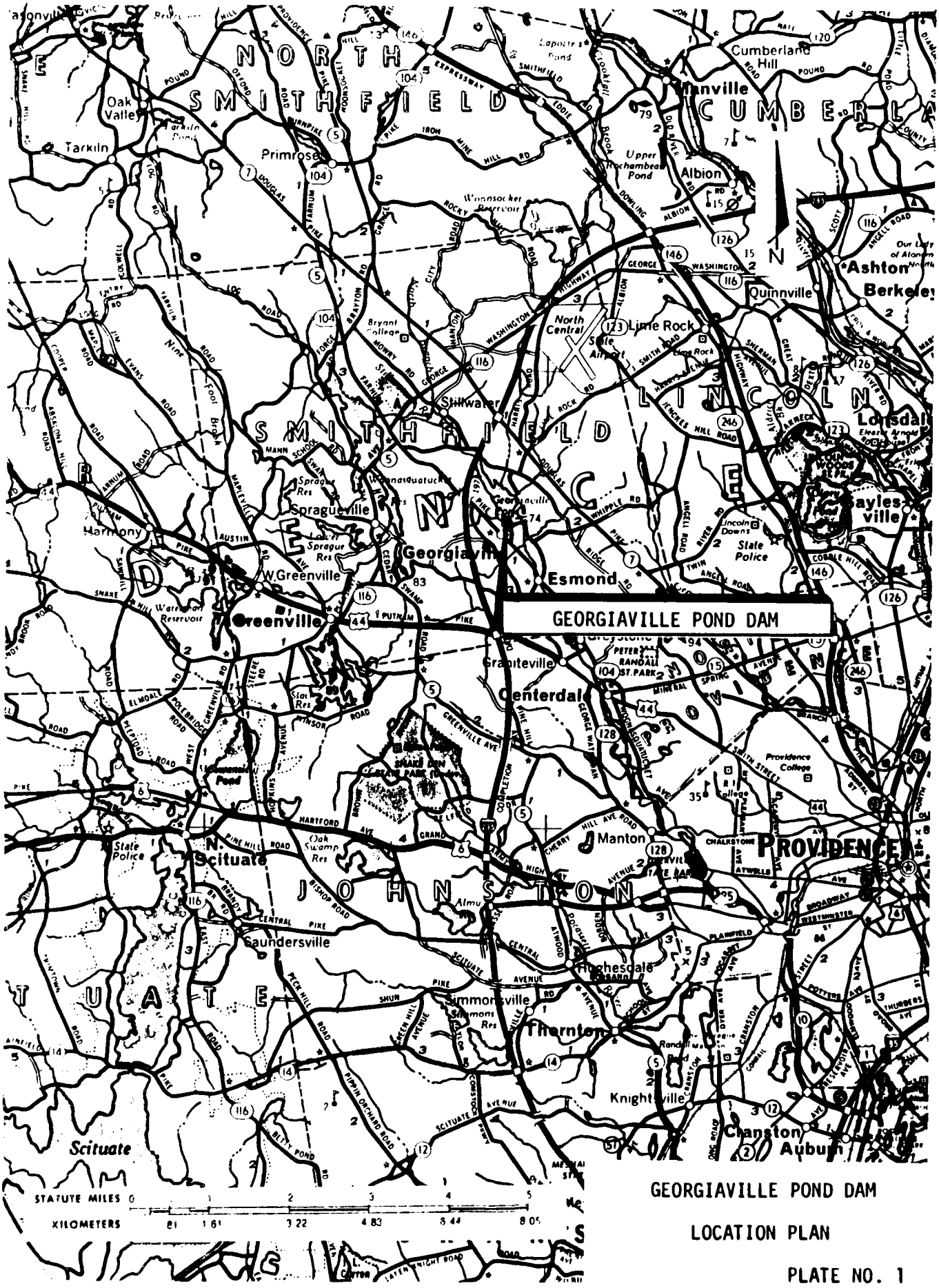
1. Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

2. Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

3. To update, verify and complete the National Inventory of Dams.

1.2 Description of the Project

a. Location. Georgiaville Pond Dam is located in the Town of Smithfield, Providence County, Rhode Island. The dam is in the village of Georgiaville, which is part of Smithfield, Rhode Island. (See Plate No. 1). The dam impounds water from the Woonasquatucket River which drains a 33.58 square mile watershed of rolling terrain. The reservoir has a total surface area of 130 acres. The impoundment is aligned in a northwest-southeast axis, with the dam located at the southeast extremity.



GEORGIAVILLE POND DAM

LOCATION PLAN

PLATE NO. 1

OVERVIEW PHOTO - GEORGIAVILLE POND DAM

good repair. The old wood gate paddles have been replaced with steel, however, these were not observable. Observations made in October, 1978, report seepage present on the downstream face of the outlet works control structure. This seepage seems to emerge from the joints in the stonework. Efflorescence on the face of the masonry was also observed.

3. Abandoned Outlet. An old gate structure, located at about station 18, is shown in photo C-12. This structure was formerly used to control water flow through a penstock (reportedly of 9-ft. diameter) which led to the Industrial Tool and Machine Company. The water was used for power generation at the mill. This pipe was reportedly plugged with concrete, but apparently serviceable until the work was performed in 1969. Reports indicate the reservoir was drained through this outlet at that time.

d. Reservoir Area. No specific detrimental features in the reservoir area were observed during the visual inspection. The slopes of the watershed are well-covered with growth to preclude sloughing of shoreline material.

e. Downstream Channel. The downstream channel for the Georgiaville Pond Dam is the Woonasquatucket River. Directly below the spillway, the channel is in bedrock as shown in photographs C-8, C-9 and C-11. The channel curves sharply to the right just below the spillway, and runs parallel to the dam about 100 feet from the toe. This is clearly visible in the overview photograph at the beginning of this report. As indicated in photograph C-11, the downstream channel is very narrow below the spillway.

3.2 Evaluation. Based on the visual inspection, the dam appears to be in fair condition, with several areas that require attention.

Trees and shrubs on the upstream and downstream slopes of the embankment can create future seepage problems. The tree roots provide seepage paths for water if allowed to grow. Uprooting of large trees can also cause serious "piping" problems by creating pathways through the embankments.

The visible seepage exiting downstream of the toe berm should be monitored for the presence of fines as well as for changes in quantity.

The riprap is absent in many locations on the upstream slope and considerable erosion has occurred. Some portions of the upstream protected by a masonry wall have collapsed.

The downstream channel is located close to the toe of the dam. It is possible that under extreme flows, erosion could take place at the toe of the dam embankment. The freeboard allowance is greatly reduced at the beach and at portions of the railroad embankment section of the dam. This is also the case at station 22+00 and beyond, where the crest has been lowered.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures. The water level in Georgiaville Pond is normally maintained at the spillway crest (Elevation 153.00) to provide ample water for recreational use. Industrial users of water downstream of the dam require approximately 6 MGD (18.4 Ac.ft/day) from Georgiaville Pond. These industrial users withdraw the water from the Woonasquatucket River channel. When these mills require an adjustment in the flow exiting Georgiaville Pond, notification is given to the Smithfield Highway Department for gate operation. The gates are operated under the direction of Mr. Alonzo Thurber of the Smithfield Highway Department. Gage marks painted on the bedrock face on the left discharge channel wall (see photograph C-11) aid the gate operator in regulating the flow. Based on the experience of the Smithfield Highway Department, it is reported that under certain conditions, by adjusting the flow in the discharge channel to the bottom mark, the requirements of the mills are satisfied; flow at the top mark begins to cause flooding in downstream areas.

Smithfield Highway Department personnel report that gate operation is only required once or twice during the year during the normally dry season.

Correspondence on file at the Rhode Island Department of Environmental Management indicates that a directive was issued (See letter to the Georgiaville Realty Company from H. Ise, Chief, Division of Harbors and Rivers, dated August 26, 1968) in 1968 by the State of Rhode Island to empty the reservoir, until such time as repairs to the dam, spillway, gates, and downstream channel were made. This order was apparently modified by the State (September 27, 1968 letter to Georgiaville Realty Company from H. Ise) to maintain the water level 10 feet below the spillway crest.

After the emergency repair work was performed by the Corps of Engineers, the order to maintain the water level 10 feet below the spillway was restated in correspondence addressed to the Town of Smithfield and the Georgiaville Realty Company from Mr. H. Ise. This order was with the concurrence of the Corps of Engineers. See correspondence in Appendix B. This order is apparently not being adhered to properly. (See Photo C-8).

4.2 Maintenance of Dam. Maintenance of the dam consists of occasional grading of the gravel roadway along the crest of the embankment.

4.3 Maintenance of Operating Facilities. The gate operating mechanism was overhauled in 1978 and the old timber vertical lift gates were

replaced with steel gates. Operational checks of the gates are performed at the time adjustment of flow is required; no separate maintenance checks other than visual inspections are performed.

Visual checks of the gate structure and mechanism are made by the Smithfield Highway Department during the winter months. These visual checks are more frequent in the summer months because of vandalism problems.

4.4 Description of Any Warning System in Effect. Emergency action and/or warning would be coordinated through the Local Defence Civil Preparedness Director (Mr. John Murphy). He would be reached through the Smithfield Police Department.
There are no formal emergency operation plans in effect for lowering the pond level in anticipation of severe storms. Monitoring of the approach of intense storm activity is normal through the U. S. Weather Service, or local weather forecasts.

4.5 Evaluation. Regular operational or maintenance procedures for this dam and its appurtenances have not been developed or implemented. In view of the overgrown condition of the embankment, it is important that the Owner immediately institute a program of monitoring inspection and maintenance of the seepage emerging from the embankment. The gate mechanism has received recent maintenance and appeared to be well-maintained.

In reviewing the correspondence available for the dam, nothing was found in the records rescinding the order by the State of Rhode Island to maintain the reservoir water level 10 feet below the spillway crest. As the reservoir level is now maintained at the spillway crest, an operational inconsistency exists which should be resolved.

SECTION 5

HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. General. The Georviaville dam has a spillway length of 112.5 feet and a surcharge height of 5.0 feet between the top of the dam, at its lowest elevation (a length of 1000 feet), and the spillway crest. The total length of the dam is about 2500 feet. The reservoir has a total storage capacity of 1300 Ac-ft. at spillway crest elevation 153.0 and can accommodate 0.72 inches of runoff from a drainage area of 33.58 square miles. Every foot of depth in the reservoir above spillway crest can accommodate 130 Ac-Ft. of volume equivalent to 0.07 inches of runoff.

The spillway length of 112.5 feet comprises 11.25 percent of the total overflow length of the lower portion of the embankment at the beach and parking area (1000 feet) which makes it a run of river type of facility.

Total available surcharge storage is 650 Ac-Ft. which is equivalent to 0.36 inches of runoff, this dam is basically not a storage facility. The maximum spillway capacity is 3773 CFS, which is equivalent to 18.73 percent of the "test flood", which makes the dam a high spillage facility. Because the dam is an earth embankment, it should be considered unstable against overtopping.

The maximum outlet works discharge capacity of 878 CFS, (assuming the reservoir level at the top of the dam, El. 158.0) further strengthens the viewpoint that this dam is a low storage - high spillage type of facility. The dam is not overtopped until the outflow of 3773 CFS (112.4 CSM) is exceeded. When this occurs, approximately 99 percent of the additional inflow to the reservoir becomes outflow, due to the extremely small available surcharge storage.

b. Design Data. No specific design data is available for this dam or its appurtenances. In lieu of existing design information, U.S.G.S Topographic Maps (Scale 1" = 2000') were utilized to develop hydrologic parameters such as drainage area, reservoir surface area, basin slopes, time of concentration and other runoff characteristics. Elevation - storage relationships for the reservoir were approximated. Surcharge storage was computed assuming that the surface area remained constant above the spillway crest. Some of the pertinent hydraulic design data

was obtained and/or confirmed by actual field measurements at the time of the field inspection.

c. Experience Data. No historical data for recorded discharges or water surface elevations is available for this dam or its watershed. Owners of the dam have marked exposed bedrock outcrops along the downstream channel with some tailwater water surface elevations within a range of 143.75 to 145.09 to assist in the regulation of the control gates. These marks are indicative of certain specific downstream effects. As reported water surface elevation marks at elevation 143.75 indicate low flow conditions and probable release of pond waters is needed. Water surface elevation marks of 145.09 or higher mean flooding conditions downstream.

Georgiaville Pond Dam was classified as INTERMEDIATE in size, having a storage capacity of 1950 Ac-ft. at the top of the dam. The height of the dam (using the crest elevation at the beach/ parking area) is 26.7 feet. To determine the hazard classification for this dam, the impact of its failure at maximum pool (top of dam) was assessed. As a result of this analysis, Georgiaville Pond Dam is classified as a HIGH hazard structure as detailed in Appendix D.

The "Test Flood" and other floods of lesser magnitudes, were developed for comparison purposes only, based on accepted and standard procedures including Corps of Engineers guidelines for Phase-I study, and other approved methods of computing runoff. Hydrologic characteristics such as upstream storages, basin slopes, shape of watershed, etc., were qualitatively assumed in adopting various inflow discharge values.

For outflow values, routing procedures and dam failure profiles, a great emphasis was placed on the Corps of Engineers guidelines. Professional judgment was used in arriving at final values as detailed in this report, which are approximate only, and are not a substitute for actual detailed analysis.

d. Visual Observations.

1. Rehabilitate the downstream discharge channel by clearing vegetative growth, widening and protecting the channel boundaries with armor stone. The existing channel alignment is excessively close to the toe of the dam, and has the potential to cause serious erosion problems during high flows.

2. The spillway abutments require repair due to missing and dislodged stonework.

3. The timber service bridge to the outlet works structure is in serious disrepair.

4. The control gates of the outlet works structure should be protected from the weather and vandalism in a gatehouse structure.

e. Test Flood Analysis. Recommended guidelines for the Safety Inspection of Dams by the Corps of Engineers were used for the selection of the "Test Flood". This dam is classified as a HIGH hazard structure and INTERMEDIATE in size. Guidelines indicate the full P.M.F. should be used as the test flood for this classification. The Georgiaville Pond Dam watershed has a total drainage area of 33.58 square miles, 6.6 square miles, or 20 percent, is swampy or covered by storage ponds. The average basin slope is moderate and equal to 0.035, and for this analysis the watershed was considered to be flat to rolling. A "test flood" equal to the full PMF was estimated to be 600 CSM, or 20,148 CFS for a drainage area of 33.58 square miles. The outflow discharge developed using the Corps of Engineers criteria and approximate routing techniques was 20,073 CFS. Additional design data developed for this investigation is included in the following table.

GEORGIAVILLE POND DAM

Inflow, Outflow and Surcharge Data

FREQUENCY IN YEARS	24-HOUR TOTAL RAINFALL IN INCHES	24-HOUR* EFFECTIVE RAINFALL IN INCHES	MAXIMUM INFLOW IN C.F.S.	MAXIMUM** OUTFLOW IN C.F.S.	SURCHARGE HEIGHT IN FEET	SURCHARGE STORAGE ELEVATION
10	5.0	2.6	2757	2425	3.72	156.72
50	6.5	4.1	4348	4344	5.33	158.31
100	7.0	4.6	4878	4868	5.51	158.51
1/2 PMF	11.9	9.5	10074	9993	6.62	159.62
TEST FLOOD = PMF	21.4	19.0	20148	20073	8.09	161.09

*Infiltration assumed as 0.1"/hour

**Lake assumed initially full at spillway crest elevation 153.0.
(top of dam = 158.0)

NOTES:

1. Q_{10}; Q_{50}; Q_{100}; inflow discharges were computed by the approximate methodology of the Soil Conservation Service.
2. The "test flood" computation is based on COE instructions and guidelines.
3. Maximum capacity of spillway without overtopping the top of the dam elevation (158.0) is equal to 3773 CFS.
4. All discharges indicated are dependent upon the continued integrity of upstream storage reservoirs.
5. Surcharge storage is allowed to overtop the dam when exceeding the spillway capacity.
6. Test flood = one PMF = 600 CSM = 20148 CFS

f. Overtopping Potential. The spillway capacity is hydraulically inadequate to pass the "test flood" (PMF) and overtopping of the dam would occur (approximately 3.09 feet). This overtopping would occur at the beach and parking area. The inflow and outflow discharge values for this "test flood" are 20,148 CFS and 20,073 CFS, respectively. The maximum outflow capacity of the spillway in a still-water condition without overtopping of the dam is 3,773 CFS which represents 18.7 percent of the test flood overflow discharge. The overtopping potential for discharges of lesser magnitudes and frequencies (approximate only) are listed in the preceding Table. The spillway and outlet rating curves are illustrated in Appendix D.

At the spillway crest elevation of 153.0, the capacity of the outlet structure is 764 CFS. It will require two hours to lower the reservoir level the first foot assuming the pond surface area is 130 acres.

Overtopping of the dam by inflow from the "test flood" cannot be prevented if the water elevation in the reservoir is lowered 10.0 feet below the spillway crest elevation prior to a storm of this magnitude. Therefore, lowering of the pond water elevation to counteract overtopping is not considered a viable solution due to insignificant storage in the Pond. Opening the outlet works gate to prevent overtopping the dam will additionally create flooding problems downstream.

g. Dam Failure Analysis. Assuming the reservoir is full to the spillway crest, the calculated dam failure discharge of 22,000 CFS will produce an approximate water surface elevation of 146.0 immediately downstream from the dam. This flow will raise the water surface 4.0 feet over the estimated depth just prior to failure of the dam when the discharge is 3773 CFS. Normal uniform flow, obeying Manning's formula will occur approximately 6000 feet downstream from the dam with a depth of flow equal to 7.0 feet. For this distance of 6000 feet, the depth of flow will decrease from 18.0 feet to 7.0 feet. This failure discharge will damage approximately ten homes, five commercial properties, three roads (Stillwater Road, Whipple Avenue, State Rt. 104), utilities (those adjacent to the roadways) and considerable downstream flooding. Water surface elevations due to failure of the dam are computed and are in Appendix D.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. The visual inspection did not disclose any immediate stability problems. The locations where erosion is currently occurring and where it has occured in the past should be restored to avoid potential future difficulties.

b. Design and Construction Data. There is no design and construction data for evaluation of structural stability for this dam. Four borings were obtained in July of 1969, logs are available, however, boring locations are unknown.

c. Operating Records. There are no operating records available that could be used in a stability analysis of this embankment.

d. Post-construction Changes. The supplemental downstream rock toe berm, reported to have been constructed in 1969 by the Corps of Engineers, increases the general stability of the earth dam from approximately station 2+00 to 9+50. At station 11+50, the apparent stability of the embankment is decreased due to the reduction in cross-section of the dam caused by the remains of the building foundation which was excavated in the downstream slope of the dam. In the beach area from station 10+00 to 13+50, the crest of the dam has been seriously lowered, increasing the potential for overtopping but reducing the factor of safety against overtopping. The trees growing on the upstream and downstream slopes of the dam can lead to a future serious seepage problem from uprooting or rotting.

e. Seismic Stability. The Georgiaville Pond Dam is in Seismic Zone 1 and hence need not be evaluated for seismic stability according to the USCE Recommended Guidelines.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND REMEDIAL MEASURES

7.1 Dam Assessment.

a. Condition. The visual inspection indicated that the Georgiaville Pond Dam is in FAIR condition. The major concerns regarding the long-term performance of this dam include:

1. Heavy tree growth on the embankment with attendent root systems.

2. Seepage emerging along the rock berm at several locations.

3. Close alignment and potential erosion to the toe of the dam by high flows in the downstream channel.

4. Serious reduction in elevation of the crest of the dam along the beach and railroad portion of the embankment.

5. Reduced cross-section of the embankment caused by old foundations and extensions of abutting property owner's backyards.

6. Apparent confusion regarding the level at which the reservoir should be maintained.

7. Overtopping of the dam by the test flood flow and inadequate freeboard allowances for lesser storm activity.

8. Lack of riprap protection at many locations along the upstream slope of the dam.

b. Adequacy of Information. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data; but is based primarily on the visual inspection, past performance history and sound engineering judgment.

c. Urgency. The recommendations and remedial measures described below should be implemented by the Owner within one year after receipt of this Phase I Inspection Report.

d. Need For Additional Investigation. No data was recovered for this inspection that indicates that formal engineering analyses were ever performed for this dam. The visual inspection and operational history indicate that attention should be given to

the collection of current data in order that the recommendations listed below may be implemented.

7.2 Recommendations. The Owner should engage the services of an engineer experienced in the design of earth dams to accomplish the following:

1. The spillway discharge capacity is not considered adequate, therefore, further hydrologic studies are required to determine what alternative measures are necessary to significantly increase the discharge capabilities at the dam and reduce the overtopping potential.

2. Evaluate the condition of the spillway surfaces and training walls and develop a program for their rehabilitation.

3. Develop a program for bimonthly monitoring of the seepage observed along the downstream toe of the dam. Monitoring should evaluate the turbidity of the water and provide a method to determine whether substantial changes in the volume or size of suspect areas occurs. Presence of suspended solids in the water or substantial changes in flow not related to changes in reservoir level should be considered as indications of a critical condition.

4. Trees and brush on the upstream and downstream slope should be trimmed. The stumps of the trees should be removed only after a procedure has been developed by a competent engineer for proper backfill and compaction. In addition, an area below the toe of the dam of at least 30 feet should be cleared and maintained.

5. The areas on the upstream slope, where the masonry wall has collapsed and erosion has occurred, should be repaired.

6. The riprap protection on the upstream slope should be restored and placed up to the crest of the dam.

7. The flow characteristics in the downstream channel should be analyzed to determine the extent of erosion hazard to the toe of the dam. Realignment of the downstream channel away from the toe of the dam embankment may be warranted.

8. Serious consideration should be given to the full restoration of the cross section of the embankment in those areas that have been reduced by prior excavations.

9. A topographic survey of the dam and its appurtenances should be made that will result in accurate drawings of the existing conditions to be used in a program of rehabilitation of the crest of the dam. Those crest areas reduced in elevation to provide beach and parking area as well as cuts in the railroad embankments in the past should be analyzed based on current hydrologic and hydraulic data to establish an acceptable elevation consistent with current criteria.

10. Clarification between the State of Rhode Island directive to maintain the reservoir level and the current operating procedure must be investigated and resolved.

11. In lieu of the past problems with the dam, the directive from the State for the regulation of the water surface and the present condition of the dam, it is recommended that a stability and seepage analysis be made with realistic loadings to determine the present condition of the dam. A limited subsurface program to support this analysis should be conducted. Borings taken to determine the nature of the embankment soils should be located so that they could also remain as piezometers for the further collection of data.

7.3 Remedial Measures.

a. Operating and Maintenance Procedure.

1. Develop a system for the recording of data with regard to items such as water levels, discharges, time and drawdown characteristics, to assist those responsible for the monitoring and operation of the structure.

2. Implement a program to clear and rehabilitate the discharge channel of vegetation in order to increase the efficiency of the outlet.

3. The owner should properly maintain the vegetation on the upstream and downstream slopes of the dam.

4. Grass should be planted on the downstream slope after the trees have been removed and the slope repaired as recommended in Section 7.2.

5. The crest of the dam should be regraded in the areas where there are ruts or other irregularities in the surface.

6. Provisions should be taken to prevent trespassing on the slopes and the crest of the dam.

7. Continue the technical inspections of this facility on an annual basis.

8. Develop and post an emergency action plan including a warning system in order to prevent or minimize the impact of dam failure. It should include the expedient action to be taken, authorities to be contacted, and locations of emergency equipment and materials.

7.4 Alternatives. (Not applicable)

APPENDIX B-2

Selected Copies of Past Inspection Reports

1. 7 November, 1946 - Inspection Report, R.I. Department of Public Works, Division of Harbors and Rivers.

2. 4 April, 1956 - Memo from J.V. Keily, Division of Harbors and Rivers, to H. Ise, Division Chief, concerning a recent inspection.

3. 30 December, 1958 - Memo from H.O.V. Nordquist, Division of Harbors and Rivers, to H. Ise, Division Chief, concerning inspection of dam, due to a recent complaint from an Olneyville businessman.

4. 8 January, 1959 - Memo from H.V.O. Nordquist to H. Ise, concerning inspection of dam by Olneyville Businessman's Association.

5. 26 August, 1968 - Memo from Mr. H. Ise, Division Chief, Division of Harbors and Rivers, concerning a recent inspection of the dam.

6. 9 September, 1968 - Inspection Report by A. Mahtesian, Civil Engineer, for Division of Harbors and Rivers.

7. 27 September, 1968 - Memo from H. Ise, Division of Harbors and Rivers, concerning water level of the reservoir.

8. 8 October, 1968 - Memo from Whitney T. Ferguson, U.S. Department of Agriculture, Soil Conservation Service, to Charles E. Boyd, R.I. Department of Natural Resources concerning a site visit to the dam.

9. 2 April, 1969 - Memo from Frank P. Bane, Army Corps of Engineers, to Senator Allen, State of Rhode Island, concerning current repair work.

10. 2 May, 1969 - Memo from John Leslie, Army Corps of Engineers, to H. Ise, Division of Harbors and Rivers, concerning water level in the reservoir.

11. 2 May, 1969 - Memo from H. Ise to the Town of Smithfield, RI and the Georgiaville Realty Company, owners of the dam, concerning water level in the reservoir.

12. 3 August, 1975 - Report of Inspection by C.F. Replinger, Department of Natural Resources, to H. Latham, Civil Defense and A. Thurber, Town of Smithfield.

APPENDIX B-1

Correspondence pertaining to the history, maintenance, and modifications to the Georgiaville Pond Dam as well as copies of past inspection reports are located at:

Department of Environmental Management
State of Rhode Island
83 Park Street
Providence, Rhode Island 02903

APPENDIX B

ENGINEERING DATA

PERIODIC INSPECTION CHECK LIST

PROJECT Georgiaville Pond Dam DATE November 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	Timber construction throughout - Fair condition, unpainted, some decay noted. Bridge consists of timber plank deck on timber bents. The control tower forms the left abutment and the right training wall forms the right abutment. Bridge has no railings. The bridge spans the right portion of the spillway only. The footpath leading to the bridge is steep and hazardous.

PERIODIC INSPECTION CHECK LIST

PROJECT Georgiaville Pond Dam DATE November 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Not observable, underwater. (Same channel as for intake structure.)
b. Weir	
General Condition	Fair to good. Right portion of spillway crest - concrete cap on granite cut stone; fair condition. Left portion of spillway - cut stone only; good condition.
Rust or Staining	Minor staining noted
Spalling	None observed
Any Visible Reinforcing	None observed
Any Seepage or Efflorescence	None observed
Drain Holes	None observed
c. Discharge Channel	Same as for outlet channel.
d. Training Walls	Unmortared stone masonry.
General Condition	Fair. Some dislodged and missing stones noted. Missing stonework on right training wall reduces effective height of wall.
Seepage or Efflorescence	None observed
Drain Holes	None observed

PERIODIC INSPECTION CHECK LIST

PROJECT Georgiaville Pond Dam DATE November 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	See Control tower checklist. Structure is the same.
Channel	Bedrock Channel
Loose Rock or Trees Overhanging Channel	Rock and trees overhang channel.
Condition of Discharge Channel	Good condition, narrow.

PERIODIC INSPECTION CHECK LIST

PROJECT Georgiaville Pond Dam DATE November 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	Not applicable

PERIODIC INSPECTION CHECK LIST

PROJECT Georgiaville Pond Dam DATE November 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	Mortared cut stone masonry
General Condition	Good
Condition of Joints	Good
Spalling	None observed
Visible Reinforcing	Not applicable
Rusting or Staining of Concrete	Not applicable
Any Seepage or Efflorescence	Observations made in October, 1978 show seepage on downstream face of control tower. Seepage emanates from joints in stonework. Efflorescence also evident on face of structure.
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	Not observable
Cracks	None observed
Rusting or Corrosion of Steel	None observed
Drain Holes	None observed
b. Mechanical and Electrical	Vertical lift, rack and pinion gate mechanisms. Both mechanisms appeared to be in good condition.

PERIODIC INSPECTION CHECK LIST

PROJECT Georgiaville Pond Dam DATE November 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	*
a. Approach Channel	
Slope Conditions	Not observable
Bottom Conditions	Not observable
Rock Slides or Falls	Not observable
Log Boom	None
Debris	Not observable
Condition of Concrete Lining	Not applicable
Drains or Weep Holes	Not applicable
b. Intake Structure	Mortared cut stone masonry
General Condition	Good
Stop Logs and Slots	None

*Note. An abandoned intake structure exists as shown on the plans. The purpose of this outlet was for industrial water supply. The conduits are reportedly filled with concrete and the structure is abandoned.

PERIODIC INSPECTION CHECK LIST

PROJECT Georgiaville Pond Dam DATE November 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	Not Applicable

PERIODIC INSPECTION CHECK LIST

PROJECT Georgiaville Pond Dam DATE November 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Unusual Embankment or Downstream Seepage	Seepage observed downstream of rock toe at several locations
Piping or Boils	None observed
Foundation Drainage Features	Rock toe berm at downstream toe.
Toe Drains	Rock toe berm
Instrumentation System	None observed
Vegetation	Extensive on upstream and downstream slopes. Large trees up to 3' dia. on downstream slope.

PERIODIC INSPECTION CHECK LIST

PROJECT Georgiaville Pond Dam DATE November 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	111.8 to 104.9 (varies)
Current Pool Elevation	100.20 based on spillway crest Assumed Elev. = 100.00
Maximum Impoundment to Date	
Surface Cracks	None observed
Pavement Condition	Not paved except in beach parking area. Generally soil with little vegetation.
Movement or Settlement of Crest	Slight undulation of crest between sta. 2+00 and 10+00
Lateral Movement	None observed
Vertical Alignment	Slight undulation of crest
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	Apparent movement of vertical wall next to floor slab of dance hall ruins.
Trespassing on Slopes	Footpaths on downstream slope.
Sloughing or Erosion of Slopes or Abutments	Erosion observed on upstream and downstream slopes.
Rock Slope Protection - Riprap Failures	Considerable evidence of riprap failures on upstream slope.
Unusual Movement or Cracking at or near Toes	None observed

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Georgiaville Pond Dam
Smithfield, RI

DATE November 30, 1978

TIME 8 AM to 3 PM

WEATHER Cold and clear

W.S.ELEV. 153.20 U.S. _____ D.S.
Assumed Elev. Spillway crest =153.00
from U.S.G.S.topographic sheet

PARTY:

1. S. Khanna - CEM
2. R. Brown - CEM
3. D. Sluter - CEM
4. R. Murdock - GEI
5. S. Whiteside - GEI
6. A. Thurber - Town of Smithfield
7. E. Hilton - Town of Smithfield
8. H. Latham - State of R.I. Def. Civil Preparedness Agency
9. _____
10. _____

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

APPENDIX A

INSPECTION CHECK LIST

R. I. DEPARTMENT OF PUBLIC WORKS
DIVISION OF HARBORS AND RIVERS

SPECIAL INSPECTION REPORT

DAM NO. 126

INSPECTED BY JOHN V. KEILY

TOWN - SMITHFIELD

DAM NO 126 NAME GEORGIAVILLE ON ~~BROOK~~ RIVER WOONASQUATUCKET RIVER WATERSHED WOONASQUATUCK

OWNER ~~SEMOLINA MACARONI COMPANY~~ Industrial Tool & Machine Co

ADDRESS HIGGINS STREET, GEORGIAVILLE, R. I. TEL. CENT. 0033

REPORT ON—NEW CONSTRUCTION REPAIRS INSPECTION ONLY X

PLANS BY APPROVED CONTRACTOR

TICKLER

SPILLWAY
TYPE
CONDITION

DRAW-OFF GATES
NUMBER
CONDITION

TRENCHES & WHEELS

EMBANKMENT
TYPE
CONDITION

APPROACHES

EROSION

BRUSHES & TREES

RIPRAP

PRESENT USE

WHO CONTROLS

WHO CONTACTED AT SITE

INSTRUCTIONS LEFT

IN EMERGENCY

INSPECTION REPORT BY JOHN V. KEILY REASON ROUTINE DATE 11/7/46

EMERGENCY:

1. WILLIAM CONNELL, ENGINEER MILL TEL CENT. 0033

2. F. ROSSI, MANAGER, 124 COMMODORE STREET, PROVIDENCE. TEL. DEXTER 6497

11/7/46

LONG HIGH EARTH EMBANKMENT RETAINING LARGE POND. FOUR LARGE GATES IN SOUTH END OF POND CONNECT WITH 9' OR 10' STEEL PIPE WHICH ENTERS MILL YARD AND CONNECTS TO A DUAL WHEEL AND 200 KW GENERATOR. USED EVERY DAY. FOUR GATES REPAIRED IN 1945 AND IN GOOD OPERATING CONDITION. NUMEROUS SMALL TREES ON EMBANKMENT; REQUESTED TO BE CUT AND SOME POINTING REQUIRED ON FACE OF SPILLWAY (NORTH OF GATE HOUSE). ONE SMALL LEAK ON THIS SECTION OF SPILLWAY IS SPOUTING ABOUT 1" STREAM OF WATER TO ROCKY APRON BELOW. ONE 14" FLASH BOARD IN PLACE ON SOUTH SECTION OF SPILLWAY TO-DAY. WATER IN POND IS ABOUT ONE FOOT BELOW SPILLWAY LEVEL. 1936-37 SEMOLINA PUT IN NEW GATES AT SPILLWAY (DRAW-OFF GATE 4'X5') 1895

See Report 1895 - pg 5
Owner directed to hold water in reservoir to Elev. 92.0 =
Elev. of spillway at East side of Reservoir.
(South spillway (40' wide) with 12" flash-board in place = Elev. 94

APRIL 4, 1956

INDUSTRIAL TOOL AND MACHINE CO.-GEORGEAVILLE DAM #126, GEORGIAVILLE, R.I. (PRESENT OWNER)-INTERVIEWED: MR. ST. JACQUES, MASTER MECHANIC AND MR. WM. CONNELL, PLANT ENGINEER.

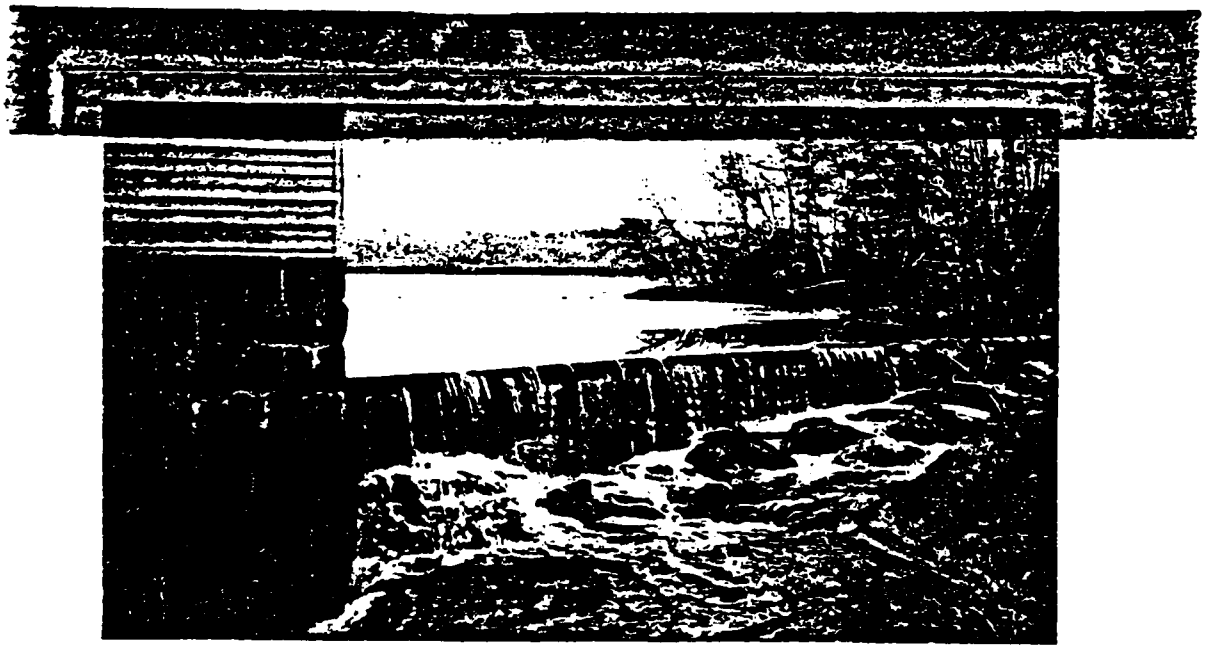
NOTES: TWO GATES AT SPILLWAY FOUR FEET BY FIVE FEET HIGH-OPEN 5" TODAY-12" FLASH BOARD IN PLACE TODAY. GATES REPAIRED BY SEMOLINA MACARONI CO. IN 1936-37. IN GOOD OPERATING CONDITION TODAY. ON SOUTH EMBANKMENT-FOUR GATES AT PENSTOCK, REPAIRED 1951-52 BY INDUSTRIAL TOOL & MACHINE CO.- PRACTICALLY REBUILT GATES, STEMS AND OPERATING MECHANISM. SMALL SEEPAGE IN EMBANKMENTS, DO NOT INCREASE, ALWAYS BEEN PRESENT-NO MATERIAL LOST. STILL USING 9' PENSTOCK, 200 K.V.A. GENERATOR-OUT FOR REPAIRS AT PRESENT TIME-JAMMED BY LOG. MR. CONNELL WAS TOLD THAT TREES UP TO 6" DIAMETER SHOULD BE CUT ON EMBANKMENTS. HE SAYS IT IS A QUESTION OF OWNERSHIP OF ABUTTING LAND - SUGGESTS TALK WITH A.W. ANDERSON OF WOONASQ. RESV. ASSN.-C/O FIDELITY & CASUALITY CO. OF N.Y.- 511 INDUS. NAT. BANK BLDG., PROV. - GA 1-4103 - ANDERSON WILL CALL ON THURSDAY [illegible] 1956. SEE MEMO TO HENRY ISE', CHIEF AS OF TODAY.

TEL. CENT. 0033

WILLIAM CONNELL - Engr.
SEMOLINA MACARONI CO.
HIGGINS STREET
GEORGIAVILLE, R. I.

REPRESENTED BY A. J. BELFI BOX 46

#126 GEORGIAVILLE - LOOKING WEST SHOWS SPILLWAY SOUTH OF GATE-HOUSE WITH 12" FLASH BOARDS IN PLACE TODAY. 12/2/47



#126 GEORGIAVILLE—LOOKING N W SHOWS SPILLWAY NORTH OF GATE HOUSE. 12/2/47

April 4, 1956

TO: Mr. Henry Isé, Chief
FROM: John V. Keily
SUBJECT: Georgiaville Dam #126, Smithfield, R. I.
on Woonasquatucket River

I visited the Georgiaville Dam #126 today with Larry Gillman. We talked with William Connell, Plant Engineer (40 years of service) and Mr. St. Jacques, Master Mechanic for the Industrial Tool and Machine Co., present owner of Dam. They said that Army Engineers had viewed the structure and had noticed some seepage at foot of embankments. Mr. Connell says that this has been present for 40 years with his personal knowledge and shows no increase in volume. He is operating the pond at an elevation agreed upon in 1895 (see 1895 Report) 2 gates on spillway (4' wide x 5' high) were partly open today (5"). Gates and operating mechanism are in good condition. Four (4) gates and controls at entrance to 9 foot penstock to mill are in good condition (repaired by Industrial Tool and Machine Company in 1951-52).

I made a suggestion that tree growth on embankments should be cut to reduce root systems and possible leakage. Many trees (now up to 5" to 6" in diameter) are growing on both sides of embankments. Mr. Connell suggested that we contact A. N. Anderson of the Woonasquatucket River Assn. for information on ownership of abutting land. J.V.K do this,

We have left a call for Mr. Anderson at his office of the Fidelity and Casualty Co. of New York, 511 Industrial Bank Bldg., Providence, R. I. - Ga. 1-4103. He is expected in his office on Thursday, April 5, 1956.

There appears to be no impending danger at this dam at the present time and the plant officials appear to be aware of their responsibilities in not letting the water get too high in the pond.

The question as to who is responsible for keeping the trees cut on embankments will be settled shortly and an order should then be issued for this corrective measure.

John

John V. Keily

John V. Keily

H 1/2 - 4-5-56

1-2

State of Rhode Island

INTER-DEPARTMENTAL COMMUNICATION

December 30, 1958

TO Mr. Ise'

DEPT. Chief, Division of Harbors & Rivers

FROM H. O. V. Nordquist

DEPT Division of Harbors & Rivers

SUBJECT: Inspection of Georgiaville Dam (R. I. #126)

Per your verbal instructions of this date, Michael Pella and the undersigned made an investigation of the condition of the above-referred to dam, in connection with a complaint made by Mr. Paul A. San Souci of Olneyville, R. I. In Mr. San Souci's complaint he stated that the dam was in a very poor condition and that the businessmen of Olneyville were concerned with the possibility that at some future date the dam may be broken and the business section of Olneyville flooded by the rush of water through the broken dam.

For your information Mr. John V. Keily, formerly of this office, made the last inspection of record on April 4, 1956. This report is available in the folder on the subject dam. ~~This~~ statement in general, in regard to his inspection of April 4, 1956, was that the dam was in good condition. On my inspection of this date it appears that the dam is still in good condition, but that certain repairs might be necessary, especially on the portion of the dam opposite to the spillway section. This portion of the dam rises above the pond and flashboard elevation by about 3 or 4 feet and in about one-half of this section there are several leaks underneath the capstone of this section.

The gate section in the middle of the dam appeared to be in good condition. The spillway section could not be investigated since there was a considerable amount of water coming over the top of the spillway at time of inspection. But it appeared that the spillway was in good condition. After completing the physical inspection of the dam, we visited the office of the owners of this dam (Industrial Tool & Machine Co.), located near the site of the dam, and spoke with Mr. William Connell, Plant Engineer. He was asked whether or not any effort had been made by the owners of the dam to observe the condition of the dam and keep it in repair, since Mr. Keily's inspection of April 4, 1956. Mr. Connell said he did not know of any reports having been made since that date, or any consideration been given by the owners to keeping the dam in repair.

My conclusion is that the dam, as it is at present, is not in a dangerous condition, since in the section opposite the flashboard or spillway section and pond level, just upstream of the retaining section is only about one foot below the top of this section, and is about 15 or 20 feet wide, and forms a substantial section to prevent any break in this part of the dam. However, some consideration should be given to correcting or repairing the dam to stop the leaks through this section ~~thereof~~. This could be done at a nominal cost.

Harry O. V. Nordquist

State of Rhode Island

INTER-DEPARTMENTAL COMMUNICATION

January 8, 19 59

TO Mr. Ise

DEPT. Chief, Division of Harbors & Rivers

FROM H. V. O. Nordquist

DEPT Division of Harbors & Rivers

SUBJECT: Inspection of Georgiaville Dam (R. I. #126)

In connection with my memo of December 30, 1958, I made arrangements with Mr. Paul A.San Souci to visit the site of the above-noted dam in order to have him observe the condition of the said dam as I saw it.

Mr. San Souci brought along with him on this inspection, Mr. Richard A. McDermott, President of the Olneyville Businessmen's Association, and Mr. Kurken Kalunian, owner of the Kalunian Company Store at 1937 Westminster Street, who are vitally interested in the condition of this dam.

We visited the dam at about 11:15 and inspected the dam from downstream side and found it in the same condition as on my previous inspection on December 30, 1958. They observed the condition as I had in my other report, and agreed that the dam, as it now exists, is in no immediate danger of collapsing, as they inferred previously.

They suggested, however, that the owner should be instructed to repair the leaks on the non-overflow section of the dam to prevent any possible danger of further erosion or breakdown of same.

Harry O. V. Nordquist

1/2

August 26, 1968

Georgiaville Realty Company
99 Main Street
Woonsocket, Rhode Island

Gentlemen:

Georgiaville Reservoir Dam (R. I. No. 126)
Woonasquatucket River
Smithfield, Rhode Island

This is in further reference to conditions at Georgiaville Dam, in Smithfield, Rhode Island, about which I wrote you on May 7, 1968 and stressed the immediate need of a new spillway channel. Recently I made another examination of the dam. At my request I was accompanied by your Robert Kalberer and Ralph Rathier, whose home is located on land he owns in the vicinity below the dam, on the easterly side of the Woonasquatucket River.

During this inspection I made the following observations:-

1. The water in Georgiaville Reservoir was several inches above the spillway crest. Owing to the lack of a spillway channel, water going over the spillway was flowing in virtually every direction on land below the dam on the easterly side of the river. A considerable amount of this water flowed on Mr. Rathier's property before eventually reaching the river.

2. Both slopes of the dam are covered by many large trees and brush. It is probable that the stability of the dam may have been seriously impaired by the tree roots.

3. The area immediately below the dam is densely covered by trees and brush and virtually inaccessible. The ground is for the most part very wet, which condition is largely due to the flow from the spillway. I made

other observations, however, which indicate that some of these wet conditions may be caused by leakage through the dam. How extensive leakage may be cannot be ascertained under present full reservoir conditions and because of the heavy growth on the dam.

In view of the foregoing, I hereby declare Georgiaville Dam to be in an unsafe condition. It is therefore ordered that you take immediate action to empty the reservoir as soon as possible so that inundation of private property below the dam will be stopped; and that the reservoir be not refilled until such repairs as may be necessary to the dam, spillway, gates, and related structures are made, and a satisfactory spillway channel is provided. It is necessary that the reservoir be completely drained so that a dry base along the entire length of the dam will be exposed and an accurate examination of the structure thereby made feasible.

It is further required that the reservoir be emptied through the steel penstock at the southerly end of the dam and not through the gates located in the spillway structure. Considerable care shall be exercised in emptying the reservoir to prevent adverse flow conditions in the Woonasquatucket River and possible damage to properties downstream.

It is also required that this office be advised as to when emptying of the reservoir will commence and when it has been completed; also, that any problems or unusual conditions which may be encountered will be promptly brought to our attention. Moreover, no removal of trees from the dam or any major repairs to the dam, spillway, gates, etc., will be undertaken until plans and specifications for such work have been submitted and written approval thereof received from this office.

It shall be further understood that no responsibility for emptying the reservoir or for the performance of any operations with respect to the rehabilitation of the dam undertaken through or under this order, is assumed by the State or by any officer of the State; and that nothing herein shall be so construed as to impair the legal rights of any person.

Very truly yours,

H. Ise, Chief
Division of Harbors & Rivers

HI:mp
Certified Mail -
Return Receipt Requested
P. S. This is copy of letter originally addressed to
Industrial Tool & Machine Co., Inc.

NEDED-F

Inspection Report - Georgiaville Reservoir Dam, Woonasquatucket River, Smithfield, Rhode Island

Chief, Engrg Div

A. Mahtesian, Engineer

9 Sept 68
Mr. Mahtesian/cvb/394

1. The Georgiaville Reservoir is located on the Woonasquatucket River, Smithfield, Rhode Island, about eight miles upstream of the Fox Point Hurricane Barrier. U.S.G.S. sheets show 17 dams of the Woonasquatucket River and its tributaries; eight dams upstream of the Georgiaville Dam and eight dams downstream. The Georgiaville Reservoir, the second largest reservoir is 5000 feet long and 1800 feet wide. The reservoir was used in the past for mill water supply and it is used now for recreational purpose. There is a town beach and many residential properties along the periphery of the reservoir.

2. The dam was built about 100 years ago and is an earth embankment about 2500 feet long; more than half of it is 20 to 30 feet high. The side slopes are about 1 vertical on 1.5 horizontal, and the crest is 23 feet wide. The upper five feet of embankment on the reservoir side of the crest is retained by a stone wall. There is no information available in regard to the internal zoning of the dam and to the type of embankment and foundation materials. The spillway, located on its left abutment (northerly end), is a low cut stone wall founded on rock. There is a dual gate structure at the center of the spillway. The discharge channel starts in a narrow, short length cut and continues on along the toe of the dam for a distance of about 500 feet through a shallow ditch and shallow training dikes back toward the original riverbed. There is a gated penstock in the southerly reach of the dam adjacent to the town beach. The tailrace is located next to the Industrial Tool and Machine Company Building. The dam and appurtenant structures are owned by the Georgiaville Realty Company, Woonsocket, Rhode Island.

3. State of Rhode Island records show that the dam experienced leakage difficulties many years ago. Plans were then prepared for flattening of the side slopes, addition of an upstream impervious blanket, and inclusion of a central puddled impervious core. It is not known if the remedial work was done.

4. During the storm of last March, increased spillway flow caused flooding of private property immediately downstream of the dam. The spillway discharge channel was breached by the flood waters; to date the channel has not been repaired, and the discharge still flows through private property. A complaint made to the State of Rhode Island by the owner of a flooded property initiated this current investigation. The inclosed correspondence between the dam owner and the State of Rhode Island concerns the condition of the dam and the flooding of the private property. The latest letter dated 4 September 1968, from the Georgiaville Realty Company to Mr. H. Isé, Chief, Division of Harbors and Rivers, State of Rhode Island, indicates that further action in regard to alleviating potential flood conditions is being withheld until the dam is examined by the Corps of Engineers.

[illegible]

9 Sept 63

SUBJECT: Inspection Report - Georgiaville Reservoir Dam, Woonasquatucket River, Smithfield, Rhode Island

5. On 6 September 1963, Messrs. A. Mahtesian and H. Isé inspected the Georgiaville Dam and appurtenant structures. A representative of the owner of the dam and the property owner who made the complaint to the State, were also present. The following observations were noted by Mr. Mahtesian as being sufficiently significant to affect the safety of the dam. It should be noted that many of these observations are in agreement with those noted by Mr. H. Isé during a prior inspection by the State.

a. It is not known if the spillway and penstock gates are operable. The spillway gates have been closed for at least ten years.

b. The spillway discharge channel appears to be too small to pass flood waters. The proximity of the channel to the toe of the dam is considered unfavorable because flood waters could erode the toe of the dam.

c. The crest of the dam has been lowered a few feet in the area of the town beach. Loss of freeboard makes the area susceptible to over-topping.

d. The embankment slopes are heavily forested with large trees, and big roots can shorten the seepage path and concentrate seepage onto erodible soils. Overturning trees can tear the embankment slopes.

e. Foundation seepage is emerging out of three separate areas where the dam is about 30 feet high and holding 20 feet differential head of water. The seepage has a yellowish-red color. The coloring is probably due to the topsoil and humus through which the water emerges. Close observation of the areas did not disclose evidence of internal erosion of the dam or boils; however, definite qualifications cannot be made without further observations.

6. CONCLUSIONS: The structural safety of the dam and the adequacy of the spillway system to pass flood waters is questionable.

7. RECOMMENDATIONS:

a. All gates should be checked to insure they are operable.

b. The reservoir pool should be lowered 8 to 10 feet below spillway crest. Complete drawdown of the pool may damage fish and wildlife. Drawdown should be done at a very slow rate to prevent drawdown slides.

c. The operational capability of all reservoirs upstream of the Georgiaville Dam should be checked.

d. Stability and seepage analyses of the dam and foundation should be made. Hydraulic studies should also be made to check freeboard requirements and spillway discharge capacity.

[redacted]

NEDED-7 9 Sept 63

SUBJECT: Inspection Report - Georgiaville Reservoir Dam, Woonasquatucket River, Smithfield, Rhode Island

e. The spillway discharge channel should be relocated away from the toe of the dam.

f. All large trees should be cut, but the roots should not be pulled until plans for remedial work are made.

g. Emergency provisions should be made for operation of the Georgiaville Dam and all upstream dams. Emergency provisions should also include means for filling the crest of the dam in the area of the town beach back to its original height.

8. The above findings, conclusions and most of the recommendations were discussed with Mr. Isé upon completion of the field inspection. Mr. Isé requested this office submit a written report to him.

Incl
as

A. MAHTESIAN
Civil Engineer

cc: Engrg Div Files
Mr. Mahtesian
R&M Branch ✓

MAHTESIAN

GURNEY

Isé

Sept. 10, 1968

September 27, 1968

Georgiaville Realty Company
19 Clinton Street
Woonsocket, Rhode Island

Gentlemen:

Confirming our phone conversation today with Mr. Robert Kalberer, this office will appreciate it if you would lower the water level in Georgiaville Reservoir only to a point 10 feet below the spillway crest and maintain it at that level until further notice from this office.

The removal of the upper 10 feet of water would eliminate any immediate urgency stemming from the condition of the dam and yet preserve to some extent aesthetic conditions around the reservoir basin. Moreover, sufficient storage would remain in the reservoir to prevent possible serious damage to fish and wildlife.

Please let us know when the reservoir has been lowered to the 10-foot level so that we may make further examination of the dam at that time.

Very truly yours,

H. Isé, Chief
Division of Harbors & Rivers

HI:mp

cc. Charles E. Boyd, Director, Dept. of Natural Resources
Russell Price, President, Smithfield Town Council, Town Hall, Smithfield, R. I.
Industrial Tool & Machine Co., Inc., Higgins St., Smithfield, R. I.
Division Engineer, Waltham, Mass., Att: John Leslie, Chief, Engineering Office
General File

Angelo R. Iannitelli, Jr.

Mr. Charles Replinger
Division of Harbors and Rivers

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
Mansfield Professional Park
Storrs, Connecticut 06268

October 8, 1968

Director Charles E. Boyd 3d
Rhode Island Department of Natural
Resources
83 Park Street
Providence, Rhode Island 02903

Dear Mr. Boyd:

As requested through Fairman S. Howard, Assistant State Conservationist for Rhode Island, I visited the Georgiaville Dam on October 4, 1968 in company with you, Mr. Howard and Mr. Charles Replinger of the Division of Harbors and Rivers. The purpose of the visit was to observe the condition of the dam and appurtenances to determine whether or not a hazardous condition existed, and if such was the case, to recommend a course of action.

The sequence of events, as I understand it, originated with a request from a downstream landowner for an inspection of a low dike or wall that had breached, flooding his property; the low dike being a short distance downstream from the Georgiaville Dam. A representative of the Division of Harbors and Rivers made an inspection of the dike and the dam, and observed several seep areas along the downstream toe of the dam. The Chief, Mr. Henry Ise, then ordered the reservoir to be drawn down 10 feet so that further study could be made of the condition of the dam.

At the time of my visit, the reservoir had been drawn down an estimated 8 feet and was still discharging. There were several areas at the downstream toe of the dam where standing and flowing water had been observed prior to drawdown, and this was evident in the appearance of the vegetation and sediment depositions, though much of the water had now disappeared. However, there were some wet areas still remaining where water could be seen seeping from near the base of the dam. Other areas a short distance up on the embankment slopes showed evidence of seepage having occurred but were inactive at the time. It appeared that this reduction in seepage was a direct result of lowering the stage in the reservoir and that the danger of possible failure of the dam had thus been significantly reduced.

From the observations, then, it appears that at the previous normal reservoir stage there was movement of water through the foundation or the embankment, or both, for an undetermined period of time. The deposition of sediment and some soft, saturated fine-grained soils at the toe of the dam seem to indicate some movement and impending movement of fines at or near the base of the structure. This points to possible embankment damage or failure through "piping" or internal erosion.

Contributing to this potential damage or failure is the fact that for most of its length the dam is very thin in cross section. At some points the top width appears not much more than 12 feet wide and the side slopes of the fill are about 1:1 or possibly steeper. Thus, with a relatively short flow path and under a significant head, seepage velocities could be dangerously high. In addition, the embankment slopes, both upstream and downstream, are heavily overgrown with trees and shrubs. Some trees are as much as 15 to 18 inches in diameter and undoubtedly the root systems penetrate deep into the fill which further tends to open up paths of flow.

The original design data and plans of the Georgiaville Dam are apparently not available. Not knowing the foundation conditions nor materials and method of construction, it would seem that the decision to draw the reservoir down at this time was certainly a prudent one. Lowering the water level 10 feet appears to be sufficient to reduce any immediate hazard and should be maintained until additional study has been made.

Before any decision can be made regarding repair or reconstruction of the existing dam, a detailed investigation should be conducted. I would recommend engaging a competent consulting engineer with experience in soil mechanics and foundation engineering to take borings and perform necessary tests. It may be desirable to have the consultant include in his report a feasibility study, as well.

Recognizing again that my visit constituted a very superficial examination, I would summarize my views as follows:

1. There is strong evidence to support the possibility of failure or severe damage by piping with the reservoir at normal stage.

2. The decision to draw the reservoir down 10 feet was sound and appears to be an adequate temporary measure.

3. The piping danger is enhanced by a relatively thin embankment cross section and an extensive root system from tree growth on the dam.

4. Competent engineering consultive services should be obtained prior to arriving at any decision regarding future use of the dam.

It was a pleasure to meet you and Mr. Replinger, and I hope that this general report will be of some value to you. If we can be of any further assistance, please feel free to call on us.

Sincerely,

Whitney T. Ferguson, Jr.
Assistant State Conservation Engineer

cc:
Mr. Charles Replinger

NEDED

2 April 1969

Honorable F. Monroe Allen
State of Rhode Island and
Providence Plantations Senate
Room 326 State House
Providence, Rhode Island 02903

Dear Senator Allen:

Receipt is acknowledged of your letter dated 27 March 1969, requesting assurance that the emergency work now being done on the downstream toe of the Georgiaville Dam in the town of Smithfield, Rhode Island will permit eventual restoration of the pool level in the pond to original level on a permanent basis.

Unfortunately, no such assurance can be given by this office. The safety of this dam and the establishment of water levels to be maintained in the pool are the responsibility of the State of Rhode Island, not the Corps of Engineers.

The emergency work which is now being done on the downstream toe of this dam is being performed under PL 99/84 which has given the Chief of Engineers the authority to furnish supplementary federal assistance to State and local authorities in protective and preventative work of a temporary nature where the work is determined to be beyond State or local capability for timely execution and found justified from the economic and engineering standpoint.

This office was requested to render emergency assistance on the problem at Georgiaville Dam by the Director of Civil Defense, Rhode Island.

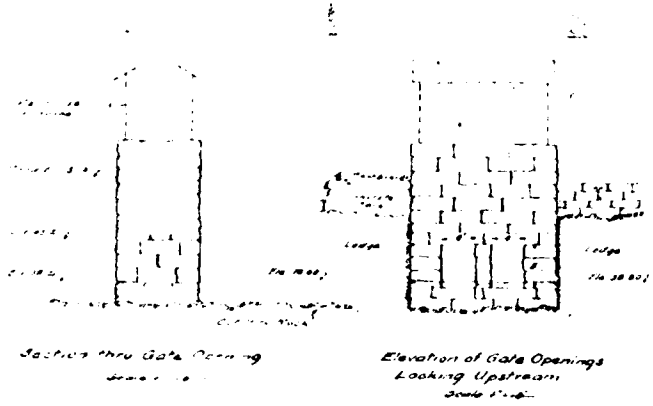
Engineers from this office visited the site and made investigations and brief studies. The results of these investigations and studies

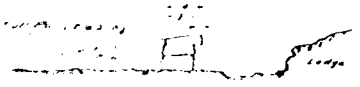
C-3 UPSTREAM FACE OF DAM, RAILWAY EMBANKMENT PORTION

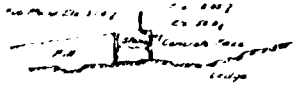
C-4 CREST OF DAM EMBANKMENT

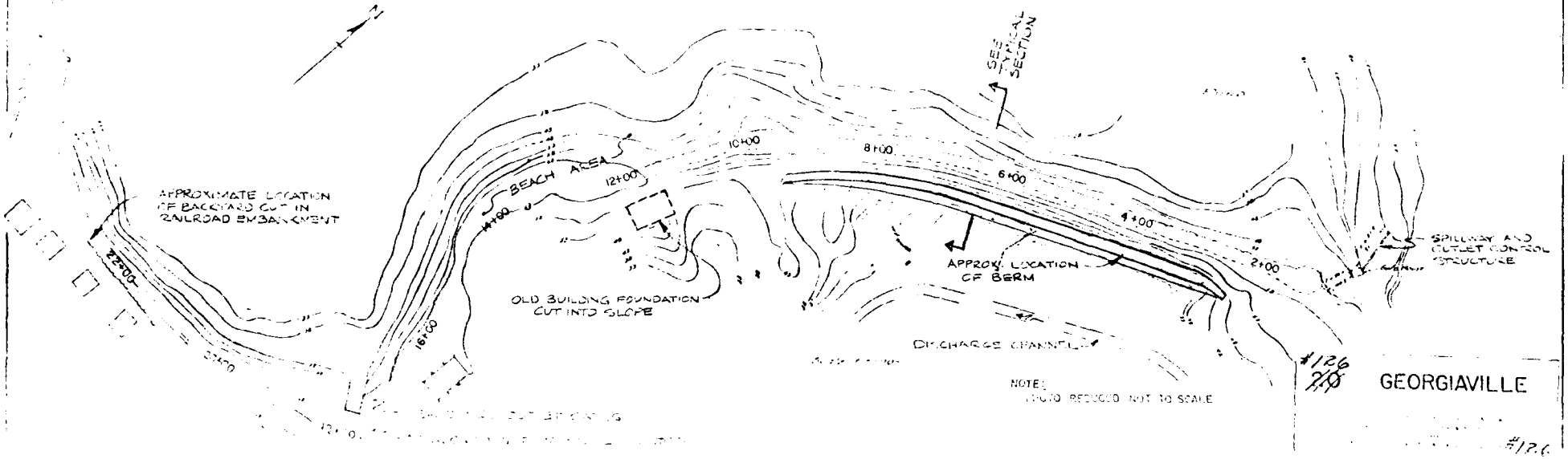
C-1 UPSTREAM FACE OF DAM

C-2 UPSTREAM FACE OF DAM









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GEORGIAVILLE
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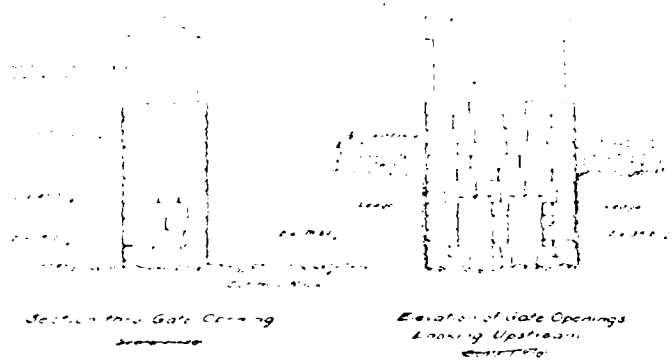

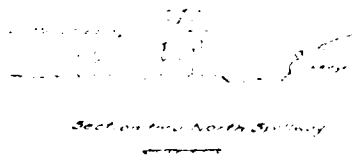

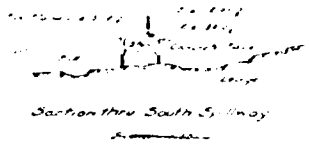

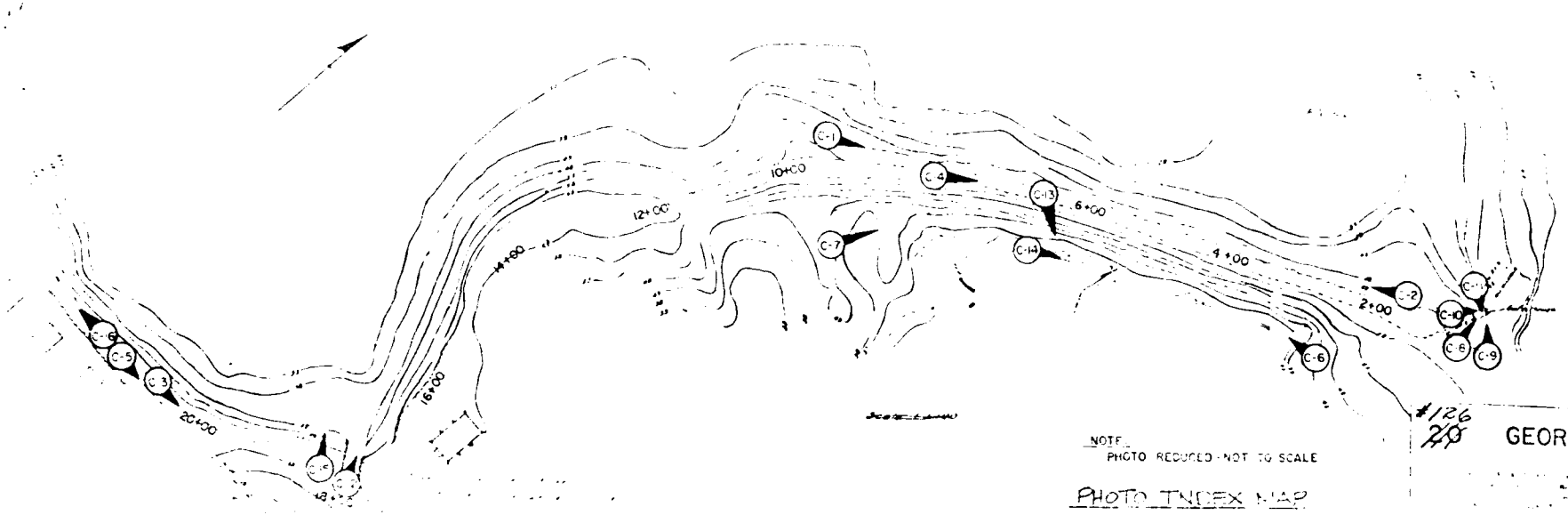

NOTE
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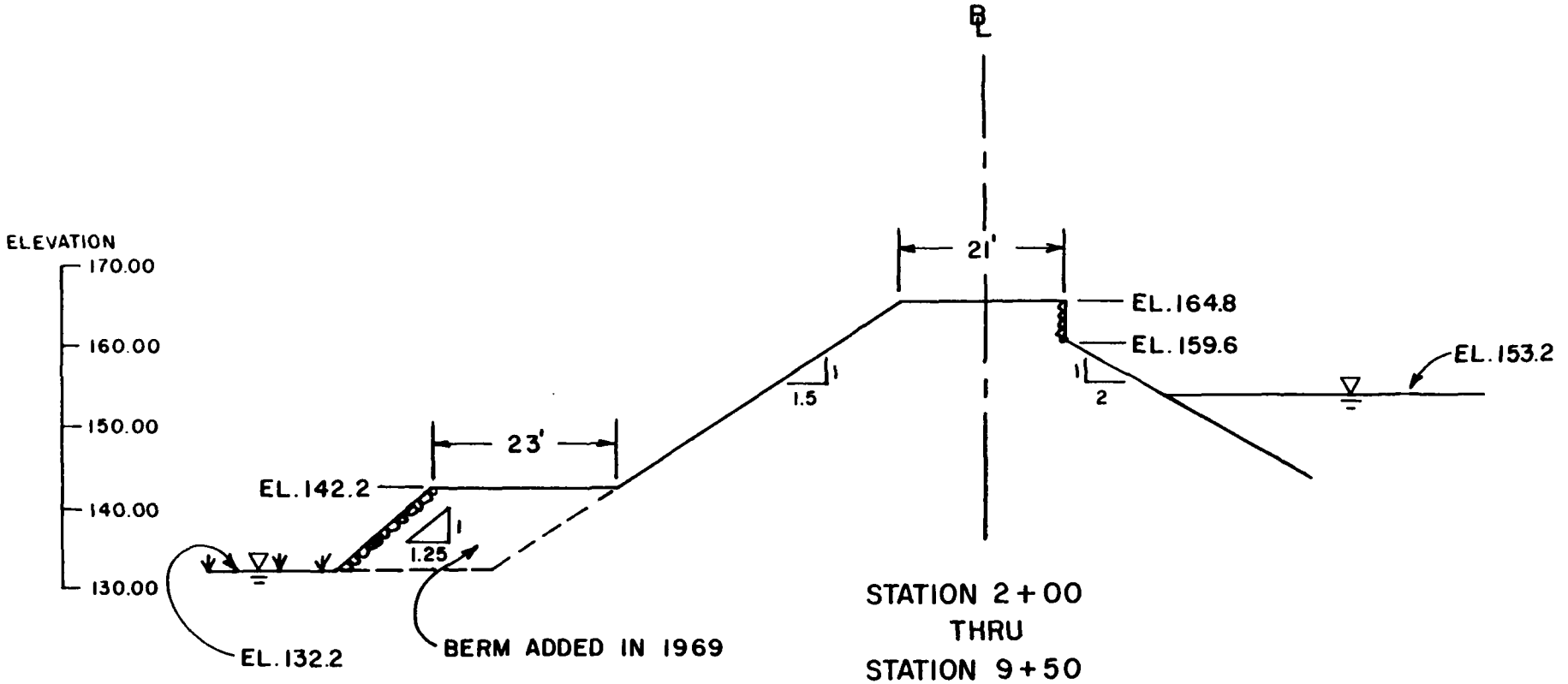
PHOTO INDEX MAP

#126
220

GEORGIAVILLE

APPENDIX C

PHOTOGRAPHS



GEORGIAVILLE DAM

TYPICAL CROSS SECTION

APPENDIX B-3

PLANS, SECTIONS, DETAILS

DEPARTMENT OF NATURAL RESOURCES

DAM INSPECTION REPORT

DAM: R. I. #126 **RIVER:** Woonasquatucket **WATERSHED:** Woonasquatucket River

NAME: Georgiaville **TOWN:** Smithfield

OWNER: Town of Smithfield

REPORT ON: Condition

REASON FOR INSPECTION: Request by Harry Latham, Civil Defense and Alonzo F. Thurber 2nd, Highway Commissioner, Town of Smithfield.

INSPECTION BY: C. F. Replinger

DATE OF INSPECTION: August 8, 1975

REPORT: Accompanied by Alonzo Thurber, the Georgiaville Dam was inspected and found to be relatively stable in that no leakage on the downstream face of the dam was observed, the riprap apparently aiding in effecting a seal; however, the downstream face, the toe of the dam and the interstices of the riprap were densely overgrown with shrubs, grasses and small trees. The upstream face of the dam was also densely overgrown. Mr. Thurber agreed to have such growth cut down periodically from now on. After removal of growth in 1969-1970, no further cutting was done which occasioned this complaint.

August 8, 1975 10:00 a.m.

View from near spillway looking South along dam

May 29, 1969

Letter of May 2, 1969 to owners of Georgiaville Dam was sent to the following individuals:

Georgiaville Realty Company, 99 Main St., Woonsocket, R. I.
Town of Smithfield, Town Hall, Smithfield, R. I.
Governor Frank Licht
Division Engineer, Waltham, Mass.
Division Engineer, Waltham, Mass., Att: Mr. John Leslie, Chief, Engineering Division
F. Monroe Allen, Esq., Attorney at Law, 58 Weybosset St.,Providence,R.I.

forces which might have caused failure of the dam had anticipated flood conditions materialized. The berm and dike construction definitely were not considered to be certain remedies; they do not of themselves fulfill the requirements of making the dam safe. However, funds used for their construction were well spent and will result in a substantial saving to the owners when final plans for the restoration of the dam are made.

On both visits it was observed that substantial water seepage continues through the dam, showing up in a number of places along its entire length, primarily at the toe, but also at several higher points on the slope of the new berm. Some seepage was also observed at still higher elevations on the original dam section. The relatively high seepage line across the dam, particularly at a time when the water is four or five feet below full reservoir, could be an indication of serious trouble in the interior of the dam.

In view of the fact that conditions at Georgiaville Dam are virtually the same as a year ago, it is required in the interest of safeguarding life and property, that the water level in the reservoir be maintained 10 feet below the spillway as previously directed by the state.

Very truly yours,

H. Isé, Chief
Division of Harbors & Rivers

HI:mp

CONCURRENCE

John L. Rago, Director
Department of Natural Resources

May 2, 1969

Town of Smithfield
Town Hall
Smithfield, Rhode Island

and

Georgiaville Realty Company
99 Main Street
Woonsocket, Rhode Island

Gentlemen: Re: Georgiaville Dam, Smithfield, R. I.

This is a report to you as owners of the subject dam on the results of two inspections of the dam made by the undersigned during the past week to investigate and study present conditions at the dam; and in particular, to make an evaluation of any benefits provided by the work done in March by the Army Engineers as an emergency measure under conditions resulting from the imminence of floods at that time. On the first visit to the dam the water in the reservoir was about 1 foot below the spillway crest; on the second visit it was about 5 feet down.

It should be emphasized initially that except for the temporary preventative work done by the Army Engineers, the recent inspections disclosed that no effort has been made or action of any kind taken by the owners to repair or rehabilitate the dam since its structural deficiencies were brought to their attention last year. There continues to be gross neglect of the structure insofar as ordinary maintenance is concerned as well as failure to recognize the seriousness of the dam's inherent weakness and the potential danger to downstream areas.

The action taken by the Army Engineers in March included construction of a gravel berm or embankment along the base of the downstream side of the dam and partial rehabilitation of a former stone and earth dike which channelled the spillway discharge back to the river. The construction of the berm and the dike was a stopgap - a temporary expedient - as it was necessary to do something as quickly as possible to afford some degree of added protection, even though limited in character, against dangerous

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

IN REPLY REFER TO
NEDED-F

2 May 1969

Mr. Henry Isé
Chief, Division of Harbors and Rivers
106 Veteran's Memorial Building
Providence, Rhode Island 02903

Dear Mr. Isé:

Members of my staff have informed me that you have been requested to allow raising of the Georgiaville Reservoir pool level and that the request is premised on the assumption that the dam was made safe by the addition of the gravel berm.

Our position in regards to restoration of the pool level was presented to State Senator F. Monroe Allen in our letter dated 2 April 1969, a copy of which was sent to you. The gravel berm was built as an emergency feature to add counter-weight to the landside slope of the dam, to lengthen the seepage path, and to provide access to the landside toe area in the event that further emergency treatment became necessary.

We endorse your requirement that regulation of the reservoir pool be continued so as to maintain the water level 10 feet below the spillway crest until it is proven that the dam and its appurtenant structures are safe under maximum loading conditions.

Sincerely yours,

JOHN Wm. LESLIE
Chief, Engineering Division

Rec'd May 5, 1969

NEDED 2 April 1969
Honorable F. Monroe Allen

weakness of this dam but rather a quick operation to lessen the chances of a failure of the dam in the event that the anticipated flooding had occurred.

Sincerely yours,

FRANK P. BANE
Colonel, Corps of Engineers
Division Engineer

Copy furnished:
Mr. Henry Ise
Chief, Div. Hbrs. & Rivers
Dept. Nat. Resources

were discussed and coordinated with Mr. Henry Isé, Chief, Division Harbors & Rivers, Department Natural Resources, State of Rhode Island. With the concurrence of Mr. Isé, the decision was reached to construct, as an emergency measure, a bank run gravel berm along the downstream toe of the Georgiaville Dam.

The engineering reason for this berm was to provide added section at the toe and also to provide a controlled means of egress for the water passing through the dam thereby lowering the hydraulic gradient to a safer elevation in the event the anticipated flood waters filled the pool.

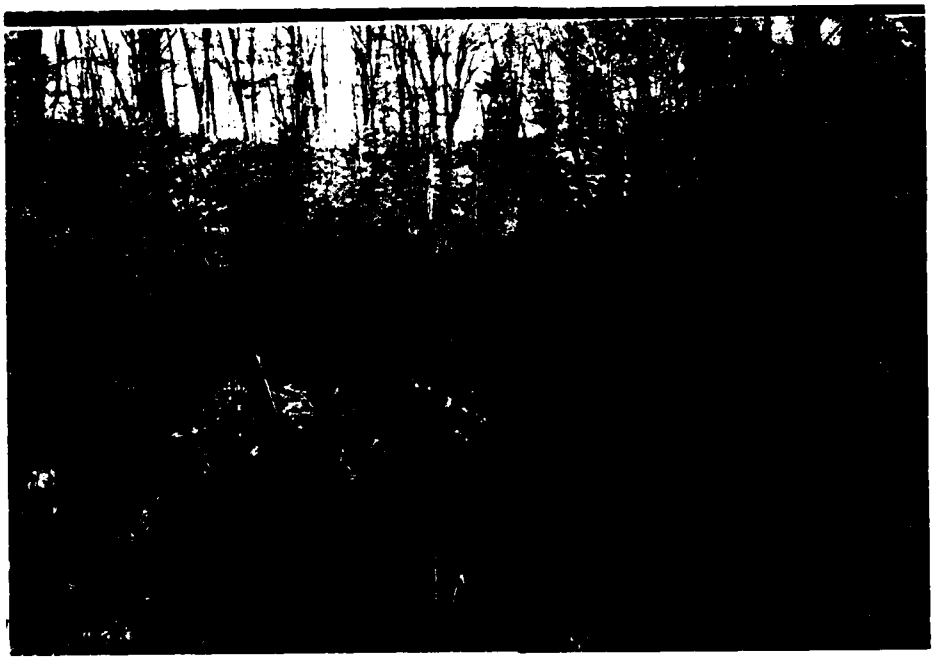
As you may be aware, Mr. Isé was concerned about the stability and safety of Georgiaville Dam for some period of time and last year issued an order to the owner to lower the level of the pond to ten feet below its normal elevation and to maintain this lower level by necessary regulation of the gates until further notice from his office. After the issuance of this order and the subsequent drawdown of the pool Mr. Isé informally requested that this office make an investigation and study to determine if we concurred from an engineering standpoint. This was done and we did concur.

Until a complete engineering investigation and study is made on this dam to determine the type and classification of materials with which it was constructed, the adequacy of the existing freeboard, spillway and gates as well as other hydraulic engineering considerations, no basis exists for making any conclusion regarding what will be required in the strengthening or rebuilding of Georgiaville Dam. There is a good possibility that the emergency berm which is now being constructed on the downstream toe might well be incorporated into the final section of the dam when rebuilding or strengthening is effected.

In conclusion, the emergency work now being done on the Georgiaville Dam was never intended to be a permanent solution to the inherent

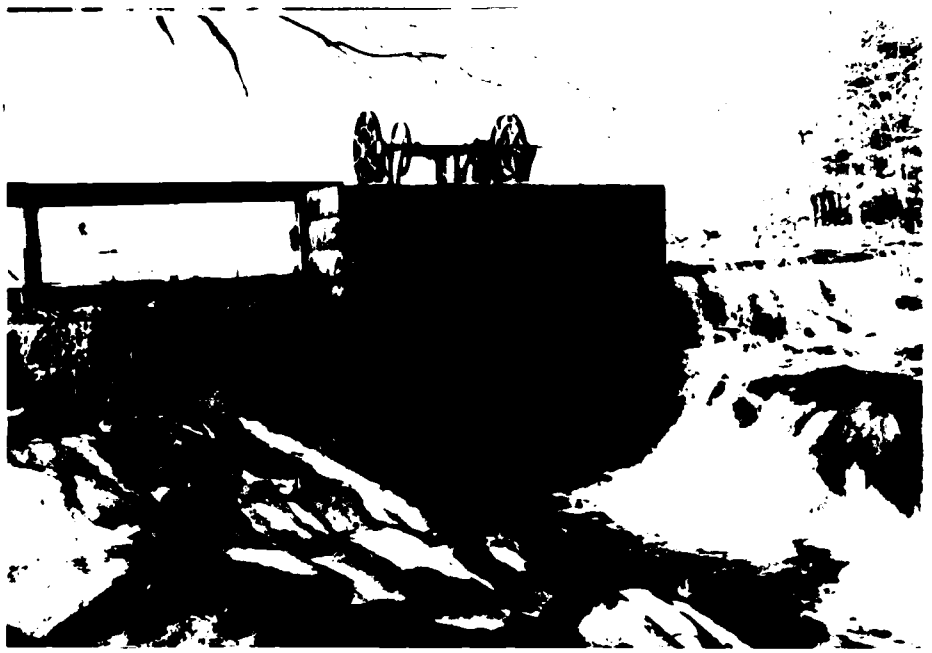
C-5 CREST OF DAM EMBANKMENT - RAILWAY PORTION

C-6 DOWNSTREAM FACE OF DAM EMBANKMENT



C-7 DOWNSTREAM FACE OF DAM EMBANKMENT

C-8 RIGHT SPILLWAY WEIR, TIMBER SERVICE BRIDGE, AND CONTROL TOWER



C-9 CONTROL TOWER, LEFT AND RIGHT SPILLWAY WEIRS.

C-10 CONTROL TOWER GATE OPERATING MECHANISM

C-11 DISCHARGE CHANNEL FOR SPILLWAY AND OUTLET STRUCTURE. NOTE THE WHITE GAGE MARKS PAINTED ON BEDROCK - LEFT SIDE OF CHANNEL.

C-12 ABANDONED CONTROL TOWER ON PENSTOCK TO MILL.

C-13 SEEPAGE POND AT TOE OF DAM EMBANKMENT

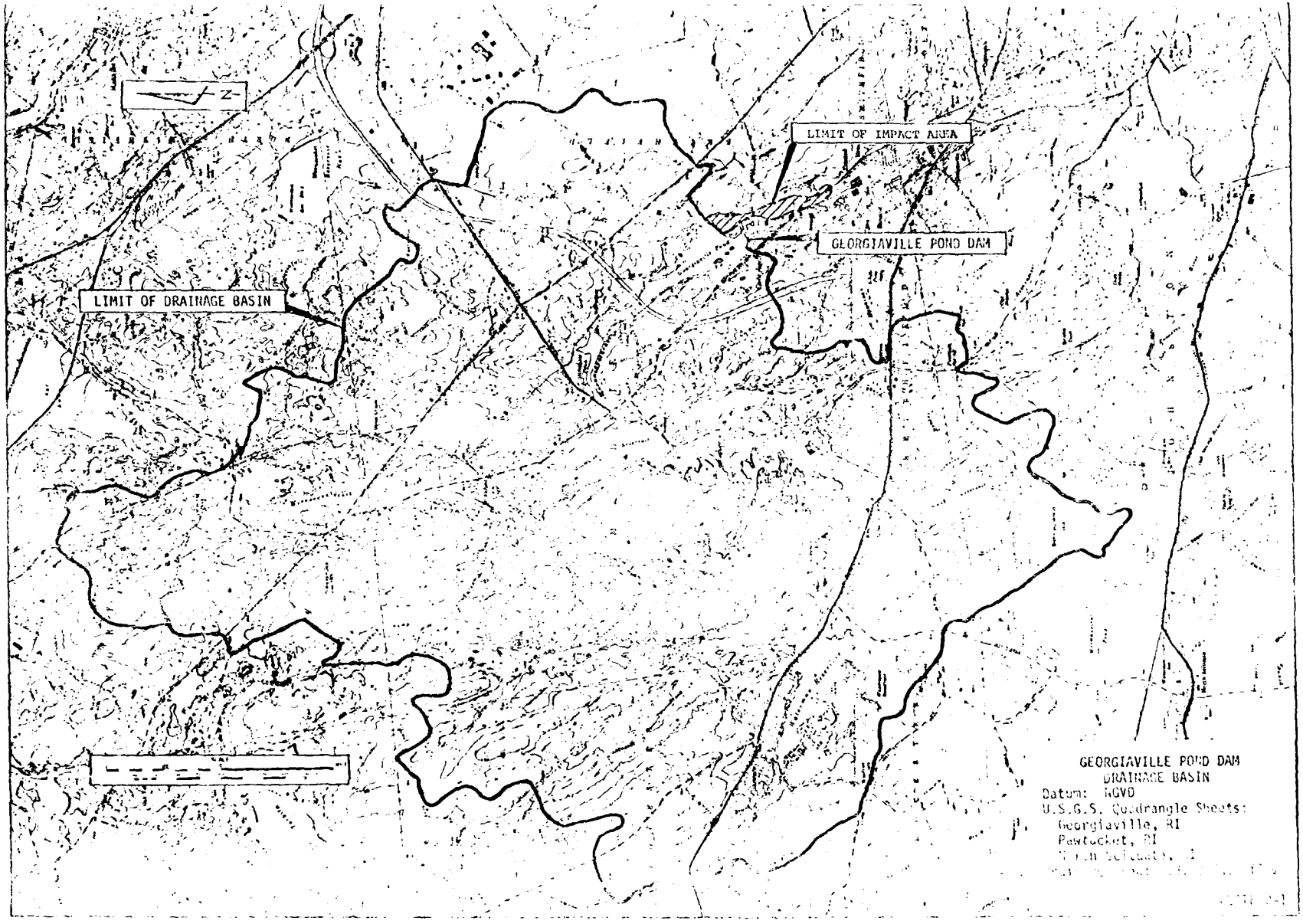
C-14 SEEPAGE FLOWING FROM ROCK TOE OF EMBANKMENT

C-15 LOW SPOT IN DAM BETWEEN RAILWAY PORTION OF DAM EMBANKMENT AND MAIN DAM EMBANKMENT

C-16 EXCAVATED PORTION OF RAILWAY EMBANKMENT FORMING BACKYARD OF LOCAL RESIDENCE.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS


LIMIT OF IMPACT AREA
GEORGIAVILLE POND DAM
LIMIT OF DRAINAGE BASIN
GEORGIAVILLE POND DAM
DRAINAGE BASIN
Datum: NGVD
U.S.G.S. Quadrangle Sheets:
Georgiaville, RI
Pawtucket, RI

A. Size Classification

Height of dam = 26.7 ft.; hence Small

Storage capacity at top of dam (elev. 158.0) = 1950 AC-FT.; hence Intermediate

Adopted size classification INTERMEDIATE

B.i) Hazard Potential

Georgiaville Pond Dam is an earth embankment which impounds a pond and supports a public beach. It also supplies water for industrial usage downstream. It is located upstream of the heavily populated village of Georgiaville, thus making the dam a High Hazard Potential.

ii) Impact of Failure of Dam at Maximum Pool (Top of Dam)

It is estimated from the rule of "thumb" failure hydrograph, that the following adverse impacts are a possibility by the failure of this dam.

a)	Loss of life	Possible	____ to ____	lives can be lost.
b)	Loss of homes	Yes	0 to 10	homes can be lost.
c)	Loss of buildings	Yes	0 to 5	buildings can be lost.
d)	Loss of highways or roads	Yes	Three	roads can be damaged.
e)	Loss of bridges	Yes	1 to 4	bridges can be lost.
f)	Miscellaneous	Yes	Recreational and process water loss.	

The failure profile can affect a distance of 6000 feet from the dam. For water surface elevation, see next page in Appendix D.

C. Adopted Classifications

HAZARD	SIZE	TEST FLOOD RANGE
HIGH	INTERMEDIATE	FULL PMF

Adopted Test Flood = One PMF = 600 CSM

= 20148 CFS

D. Overtopping Potential

Drainage Area = 33.58 sq. miles

Spillway crest elevation = 153.0 NGVD

Top of Dam Elevation = 158.0 Beach area NGVD

164.8 Top of Main Dam

Maximum spillway discharge Capacity without overtopping of dam = 3773 CFS

"test flood" inflow discharge = 20148 CFS

"test flood" outflow discharge = 20073 CFS

% of "test flood" overflow carried by spillway without overtopping = 18.73%

"test flood" outflow discharge portion which overflows over the dam = 16300

% of test flood which overflows over the dam = 81.27%

Esmond Pond is located 6000 feet downstream of Georgiaville dam. Valley storage between this dam and Esmond pond is not significant in reducing the discharge. There is a 26.0 foot drop into Esmond pond which will cause the dissipation of wave and kinetic energy of the failure discharge. Approximately, the water surface elevations between Georgiaville dam and Esmond pond will be as given on Dam Failure Analysis. The increase of depth in Esmond pond due to failure of Georgiaville dam is estimated to be 7.0 feet.

Estimating Maximum Probable Discharges - Inflow and Outflow Values Date of Inspection: 11/30/78

Name of Dam Georgiaville Pond Dam; Location of Dam Woonasquatucket R.; Town Smithfield, R.I.

Watershed Characterization Rural, moderate in slope, large U/S storages and swampy areas.; 6.60 sq. miles of drainage area is swampy or occupied by storage reservoirs

Adopted "test" flood = Full PMF = 600 CSM = 20148 CFS; Re = Effective Rainfall = 19.0 Inches

D.A. = Drainage Area (Gross) = 33.58 Square Miles; Basin Slope = 0.03 to 0.08± hence; Moderate

S.A. = Surface Area of Reservoir = 0.203 Square Miles; Time of Concentration 120 to 180 minutes

Shape and Type of Spillway = Broad crested; overflow type; concrete sill on bed rock; vertical drop.

B = Width of Spillway = 112.50 feet; C = Coefficient of Discharge = (3.09-Friction) = 3.00

Maximum Capacity of Spillway Without Overtopping = 3773 CFS = 18.78 % of test flood outflow

Top of Dam Elevation = 158.0 for 1000 ft. / 164.8 for 1000 ft.; Spillway Crest Elevation = 153.0

Overflow portion of Length of Dam = 1000 ft.; C = Coefficient of discharge for Dam = 3.0

Name of Dam	Test Flood Q_p CSM	Test Flood Q_p CFS	Inflow Characteristics h_0 in feet	Inflow Characteristics S_0 in in.	Outflow Characteristics First Approximation Q_{p1} CFS	First Approx. h_1 in ft.	First Approx. S_1 in in.	Outflow Characteristics Second Approximation S_2 in in.	Second Approx. h_2 in ft.	Second Approx. Q_{p2} CFS	Outflow Characteristics Third Approximation (Adopted) S_3 in in.	Third Approx. h_3 in ft.	Third Approx. Q_{p3} CFS
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Georgiaville Pond Dam	PMF =600	20148	15.23	1.10	20148	8.12	1.10	0.58	8.09	20073	0.58	8.09	20073
	½PMF =300	10074	6.70	0.70	10074	6.70	0.70	0.48	6.62	9993	0.48	6.62	9993

Q_p = Discharge; h= Surcharge height; S = Storage in inches NOTE: Outflow discharge values are computed as per COE guidelines.

*Note: Spillway crest was recently raised one foot by 40 feet in length; outlet structure was enlarged and fixed.

"Rule of Thumb Guidance for Estimating Downstream Dam Failure Discharge"

BASIC DATA

Name of dam Georgiaville Pond Dam Name of town Georgiaville

Drainage area = 33.58 sq. mi., Top of dam 158.0 NGVD

Spillway type = Broad crest; Overflow Crest of spillway 153.0 NGVD

Surface area at crest elevation = 130 acres = 0.203 square miles

Reservoir bottom near dam = 133.0 ± NGVD

Assumed side slopes of embankments

Depth of reservoir at dam site 26.7 = y_o = 26.70 ft.

Mid-height elevation of dam = 139.5 NGVD

Length of dam at crest = 2500 ft. Total (Overflow portion at beach=1000 ft.

Length of dam at mid-height = 950 ft. (Overflow Length)

10% of dam length at mid-height = W_b = 95 ft.

Step 1:

Elevation (NGVD)	Estimated Storage in AC-FT
153.0	1300
154.0	1430
155.0	1560
156.0	1690
157.0	1820
158.0	1950
160.0	2210
162.0	2470
164.0	2730

Step 2:

$$Q_{pl} = \frac{8}{27} W_b \sqrt{g}\ y_o^{3/2}$$

$$= 1.68\ W_b\ y^{3/2} = 22000 \text{ CFS}$$

NOTE: Failure of dam is assumed to be instantaneous when pool reaches top of dam.

Dam Failure Analysis

Failure discharge with pool at top of dam (elev. 158.0) = 22000 CFS

Depth of water in reservoir at time of failure = 26.7 ft.

Maximum depth of flow downstream of dam at time of failure = 18.0 ft.

Water surface elevation just downstream of dam at time of failure = 146.0 ± NGVD

The failure discharge of 22000 CFS will enter Woonasquatucket River and flow downstream 6000 feet until the brook crosses Farnum Pike. There is significant valley storage in this 6000 feet length of brook to reduce the discharge substantially. Also due to roughness characteristics, obstructions and frictional losses, it is very likely that the unsteady dam failure flow will dissipate its wave and kinetic energy and thus convert to steady and uniform flow obeying Manning's formulae 3,000 feet downstream. The failure profile will have the following hydraulic characteristics:

DISTANCE FROM THE DAM	WATER SURFACE ELEVATION NGVD	REMARKS
0 + 00	158.0	Upstream of dam
0 + 00	146.0	Downstream of dam
10 + 00	142.0	
20 + 00	140.0	
30 + 00	138.0	
40 + 00	136.0	
50 + 00	134.0	
60 + 00	130.0	

Beyond 6000 feet and until the brook joins _____, the failure discharge will flow in the below given channel characteristics:

Q = 19000 CFS; S = 0.005

n = 0.05 ; b = 400 ± ; d = 7.0

Side slopes = 1V or 2H.

Georgiaville Pond Dam

COMPUTATIONS FOR
SPILLWAY RATING CURVE

Spillway width = 112.5 feet; Spillway crest elevation = 153.0 NGVD

ength of dam = 2500 overflow portion=1000 feet; Top of dam elevation = 158.0 NGVD

C = 3.0

i) SPILLWAY RATING CURVE COMPUTATIONS

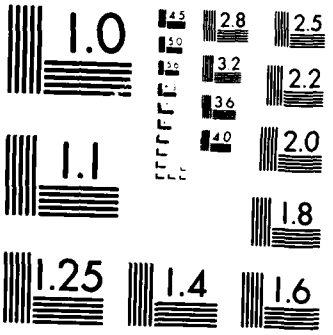
levation (ft.) NGVD	Spillway Discharge (CFS)	Remarks
153.0	0	Spillway crest elevation
154.0	337.0	
155.0	955.0	
156.0	1754.0	
157.0	2700.0	
158.0	3773.0	Top of Dam at beach
159.0	6773.0	
160.0	12259.0	
161.0	19361.0	
161.09	20073.0	Test Flood
162.0	27773.0	

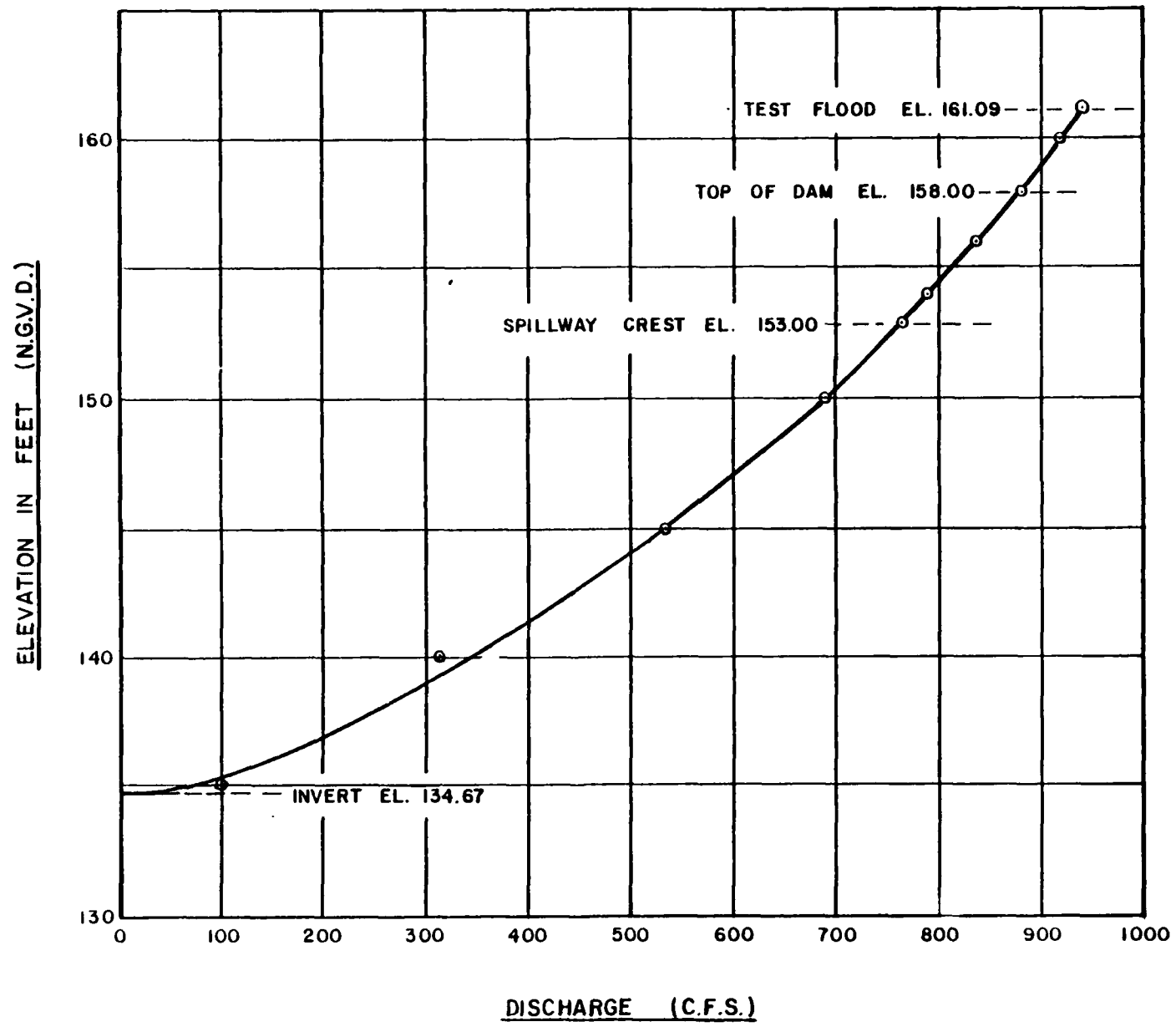
OTES:

1. Maximum Spillway Capacity = 3773 CFS
2. Maximum Outlet Capacity = 878 CFS
3. Total Maximum Discharge Capacity = 4651 CFS

AD-A156 018 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS GEORGIAVILLE POND DAM (U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV APR 79

UNCLASSIFIED F/G 13/13 NL

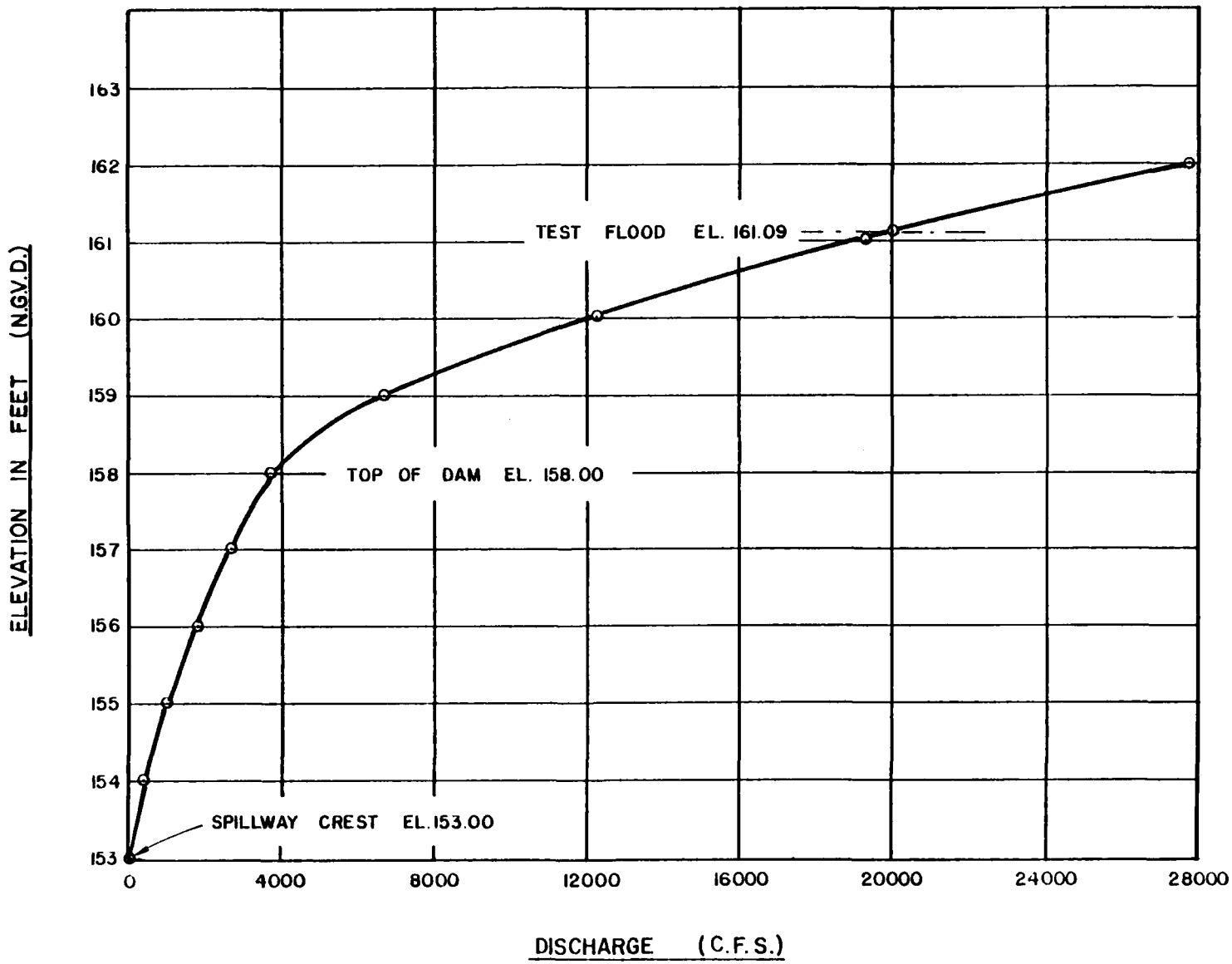




GEORGIAVILLE POND DAM
OUTLET WORKS RATING CURVE

GEORGIAVILLE POND DAM

SPILLWAY RATING CURVE



APPENDIX E

INFORMATION AS CONTAINED IN THE
NATIONAL INVENTORY OF DAMS

END

FILMED

8-85

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